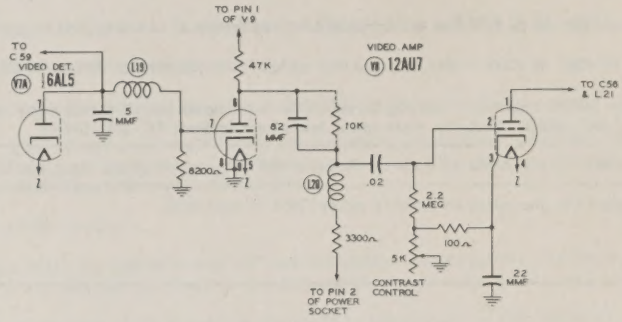
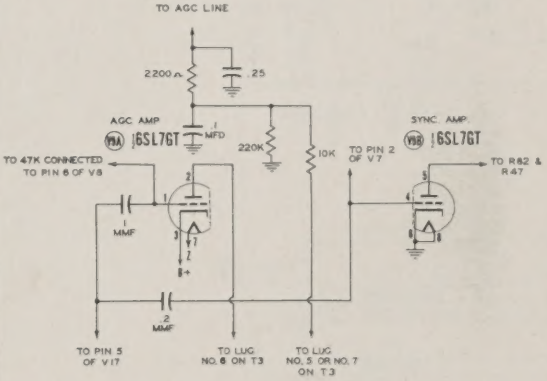
105

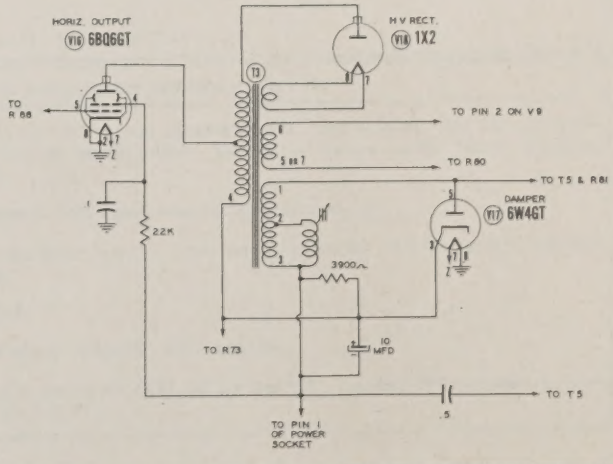
SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8, SET 94

| | |
|---|---|
| Codes 1 thru 12 | The production changes 1 thru 12 were covered in Photofact Folder 94-8. In the schematic in Folder 94-8 there should be a .2MMF capacitor connected from pin 5 of V17 to pin 3 of V9. |
| Code 13 | The contrast control is moved from the 1st video amplifier grid to the cathode circuit of the 2nd video amplifier. See partial schematic below showing the production change. |




Code 13 uses a different horizontal output transformer than used in previous codes. The new transformer is obtainable under Part #C-12M-18689 or C-201-18562. It has an additional winding to provide a pulse voltage to the AFC tube V14 and to the AGC amplifier tube V9. The changes necessitated by the new transformer are shown in the partial schematics below.




RAYTHEON MODELS C-1102, C-1104, (Ch. 12AX22) M-701 (Ch. 10AX22), M-1101, M-1103, M-1105 (Ch. 12AX22)

CONTINUED ON REVERSE SIDE



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| RAYTHEON MODELS C-1102, C-1104, (Ch. 12AX22) M-701 (Ch. 10AX22) M-1101, M-1103, M-1105 (Ch. 12AX22) (Continued) | | |
|---|---|---|
| | Code 13 (Cont.) | The contrast control is changed from 8K to 5K.<br>R52 removed.<br>The low side of L23 and R53 is connected to ground.<br>C79 changed to 82MMF.<br>C92 changed to 820MMF.<br>C91 removed.<br>R87 removed.<br>The junction of C92 and the horizontal drive trimmer is connected to pin 2 of V15.<br>A 22MMF at 500V ceramic capacitor added from junction of R88 and R89 to pin 5 of V17.<br>The 3900Ω resistor from lug three on the horizontal output transformer is used with transformer Part #C-201-18562. Remove when using transformer Part #C-12M-18689. |
| | Code 14 | Code 14 is the same as code 13 except a 10K resistor is added from pin 6 of V9 to L20. |
| | Code 15 (And group numbers 1000 up) | Code 15 is the same as code 14 except R54 is now 120Ω. |

PRODUCTION CHANGES
BULLETIN 4

## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 19, SET 52

SCOTT MODELS 67I1, 67IIA, 400, 800BT

R-53 resistor is shunted by a resistor of same value.

C-67 capacitor is removed and circuit left un-bypassed.

A 47K 1 watt resistor is added from pin #6 of V-21 to chassis frame (ground).

R-119 resistor is changed to 12K 2 watt.

R-132 resistor is changed to 5K 5 watt.

R-133 resistor is changed to 500 ohms 10 watt with one slider and is adjusted to 345 volts, at 117VAC input.

R-61 resistor is changed to 5600 ohms 1/2 watt.

The 10MMFD tweet filter capacitor is changed to 4-25MMFD trimmer type.

The junction of L27 peaking coil and tweet filter is opened and a .05-600VDC capacitor is inserted. A grid return resistor of 470K $\frac{1}{2}$ watt is connected at the junction of tweet filter coil and the .05-600 capacitor, the other end is connected to the junction of R-59 and R-61.

L31 is shunted with a 22K resistor.

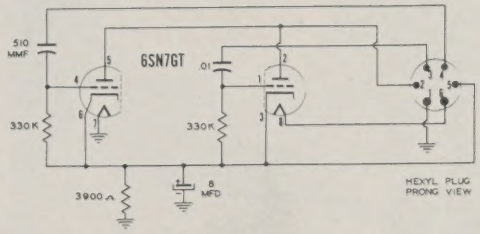
The low end of R138 and the B+ supply line of V17 and V18 should be connected to the B+ line fed by pin 8 of power plug instead of high B+ line as shown on the schematic.

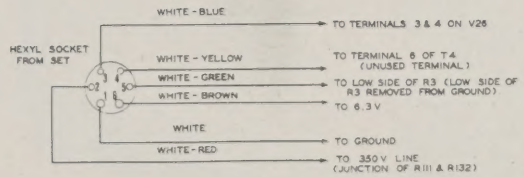
The low side of the left winding of T8 should be connected to the junction of C91 and R142.

The low side of the right winding of T8 should be connected to the junction of R141 and C125.

A picture tube protection unit is added, Kit part #2L4133.

A schematic of this circuit is given below.





HEXYL SOCKET FROM SET
WHITE - BLUE
TO TERMINALS 3 & 4 ON V26
WHITE - YELLOW
TO TERMINAL 6 OF T4 (UNUSED TERMINAL)
WHITE - GREEN
TO LOW SIDE OF R3 (LOW SIDE OF R3 REMOVED FROM GROUND)
WHITE - BROWN
TO 6.3V
WHITE
TO GROUND
WHITE - RED
TO 350 V LINE (JUNCTION OF R111 & R132)

PROJECTION TUBE PROTECTION CIRCUIT

## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11, SET 100

SENTINEL MODELS 412, 413, 414, 415

"YG" Series

The following changes have been made in the "YG" series chassis used in these models. The changes were made to prevent horizontal oscillator drift during warmup time. The chassis series number can be identified by the stamping on the back of the chassis.

1. C62 (.005MFD) and R79 (470K) horizontal AFC filter network has been removed.
2. R74 and R75, horizontal phase detector load resistors, have been replaced by a series parallel resistor and capacitor combination as follows:
   a. R74 and R75 are changed to 470K.
   b. Both R74 and R75 are shunted with a .002MFD, 200V capacitor.
   c. A 33K resistor has been added in series with R75 and pin 5 of V15. Another 33K resistor has been added in series with R74 and pin 7 of V15.



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PHOTOFACT* Folder

**ALTEC LANSING MODEL**
**ALC-205, ALC-206**

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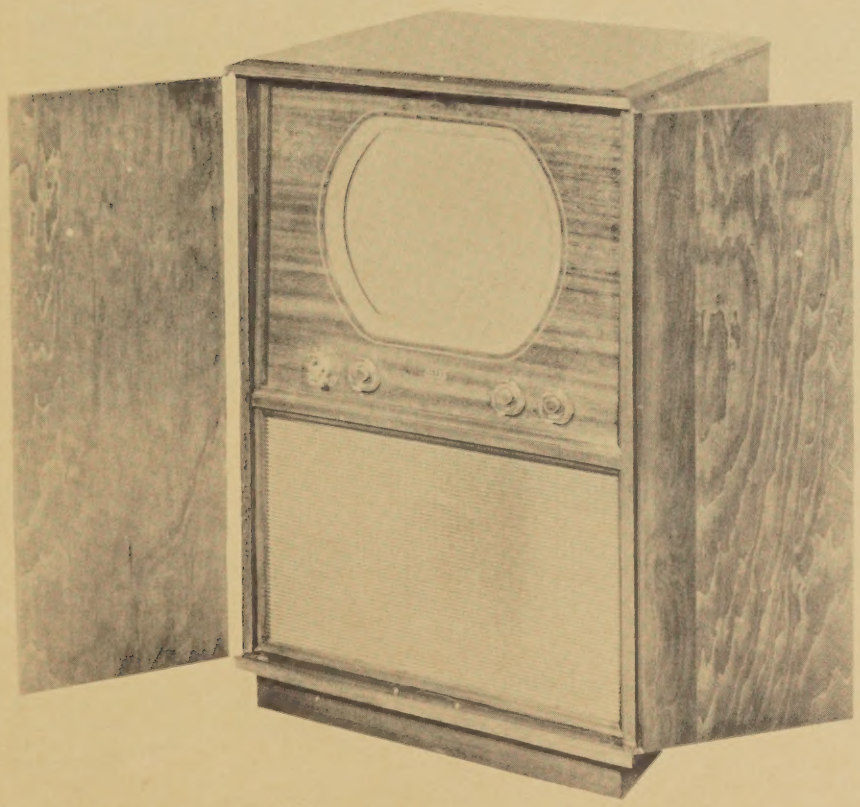
**Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.**



**MODEL ALC-206**

ALTEC LANSING MODEL
ALC-205, ALC-206

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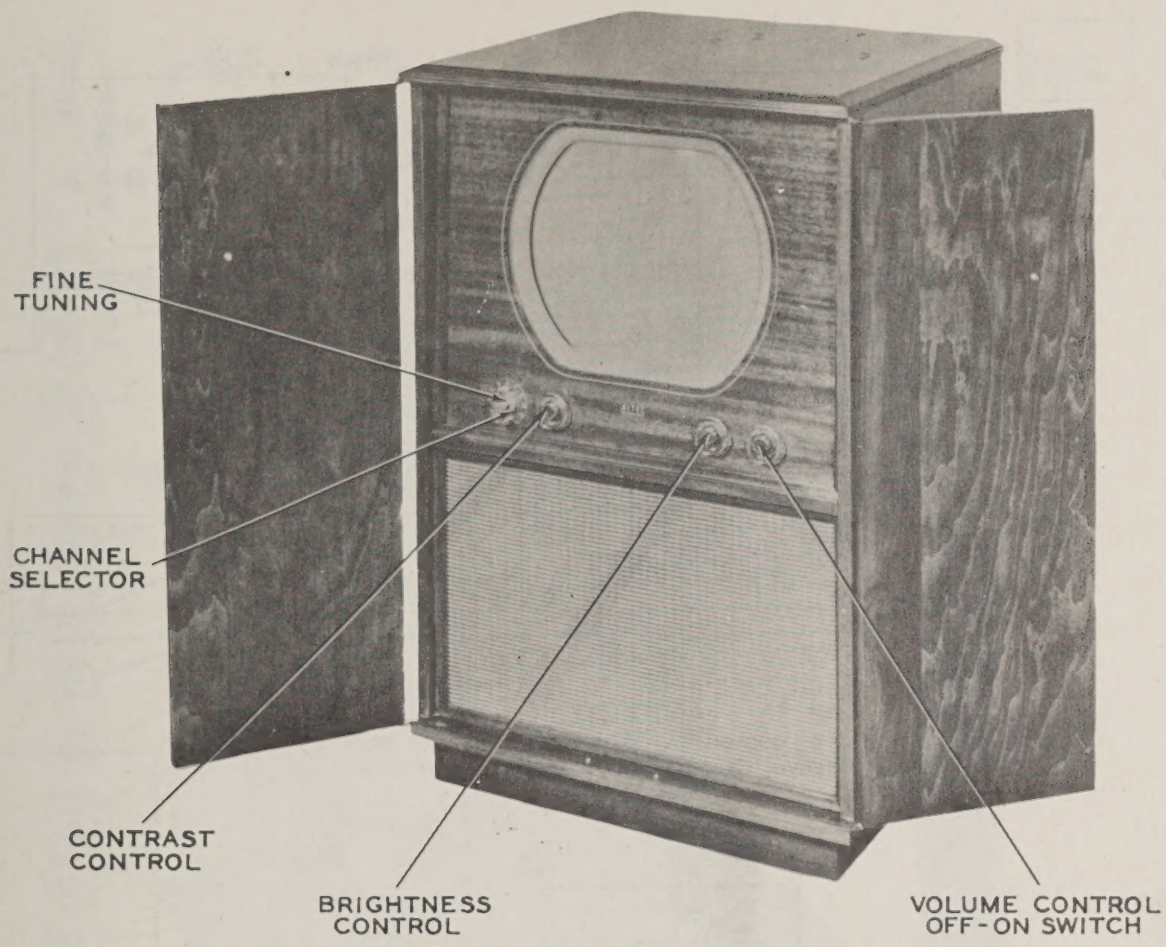
**Date 9/50 Set No. 105—Folder No. 3**

# ALTEC LANSING
# MODELS ALC-205, ALC-206




ALTEC LANSING
MODELS ALC-205, ALC-206

ALTEC LANSING MODEL ALC-206

| | |
|---|---|
| TRADE NAME | Altec Lansing, Models ALC-205, ALC-206 |
| MANUFACTURER | Altec Lansing Corp., 161 Sixth Ave,, New York 13, N.Y. |
| TYPE SET | Television Receiver |
| TUBES | Twenty Five |
| POWER SUPPLY | 110 - 120 Volts AC - 60 Cycle |
| RATING | 2.2 Amp. at 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 |

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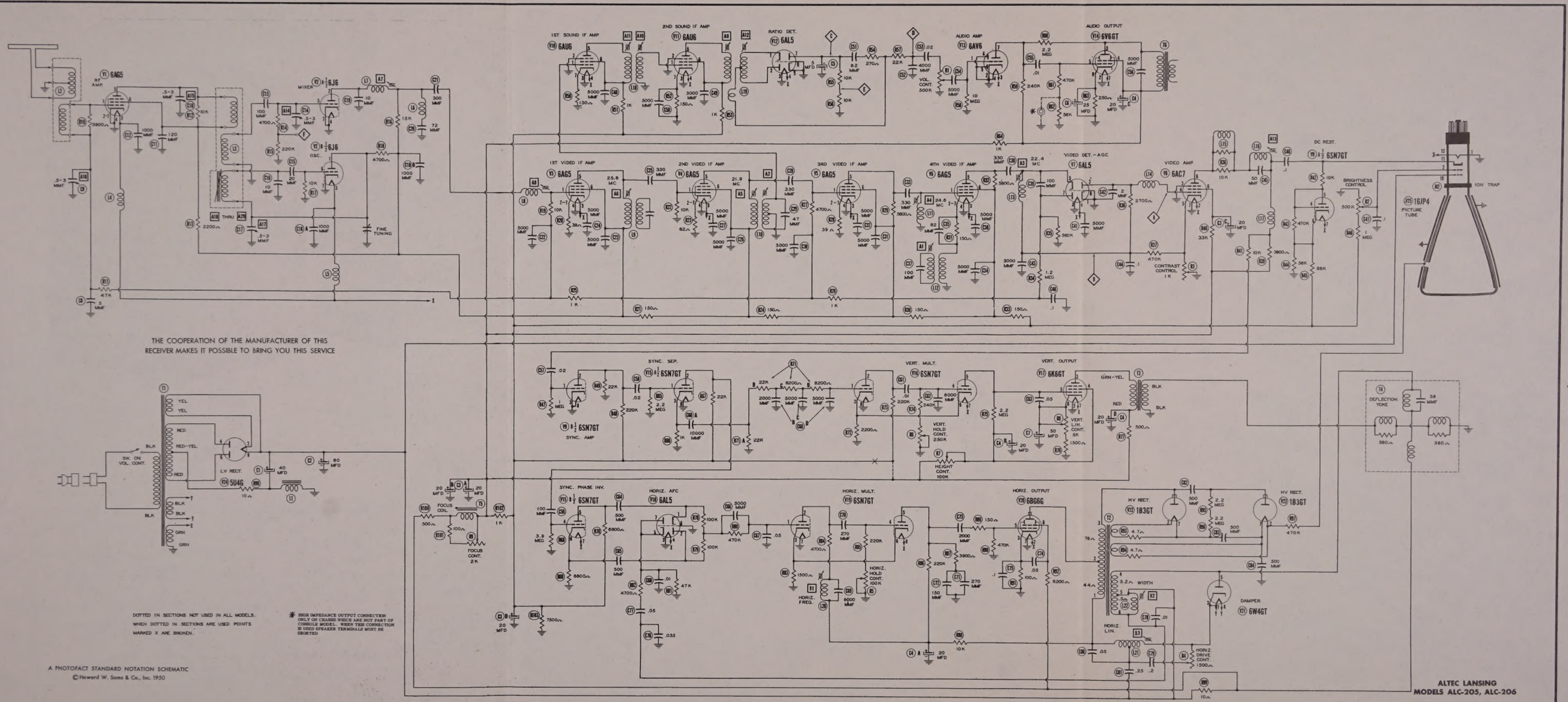
ALTEC LANSING
MODELS ALC-205, ALC-206
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DOTTED IN SECTIONS NOT USED IN ALL MODELS. WHEN DOTTED IN SECTIONS ARE USED POINTS MARKED X ARE BROKEN.
* HIGH IMPEDANCE OUTPUT CONNECTION ONLY ON CHASSIS WHICH ARE NOT PART OF CONSOLE MODEL. WHEN THIS CONNECTION IS USED SPEAKER TERMINALS MUST BE SHORTED
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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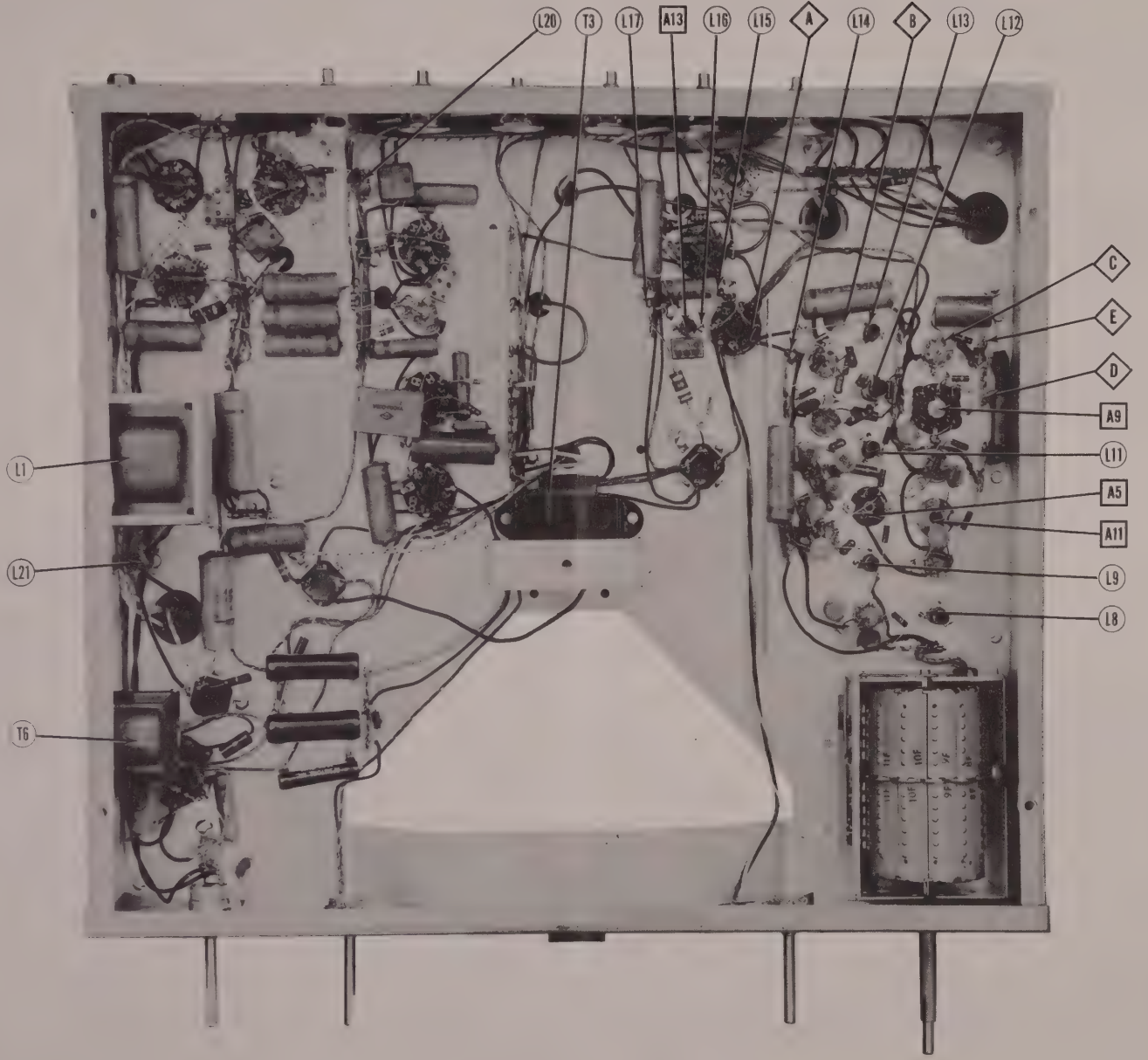
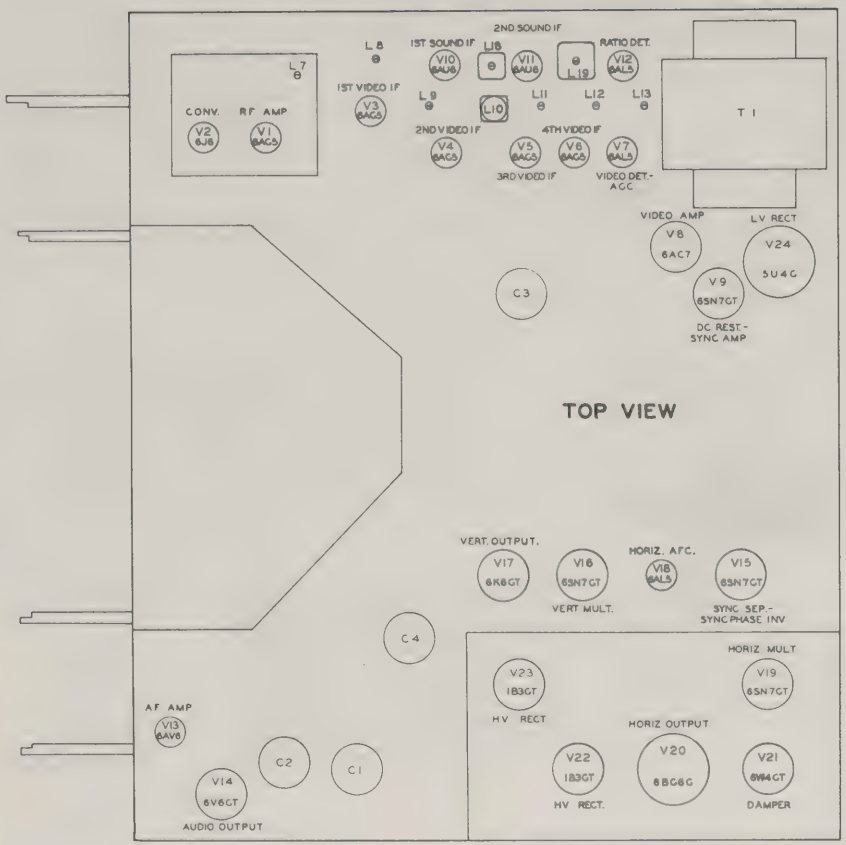
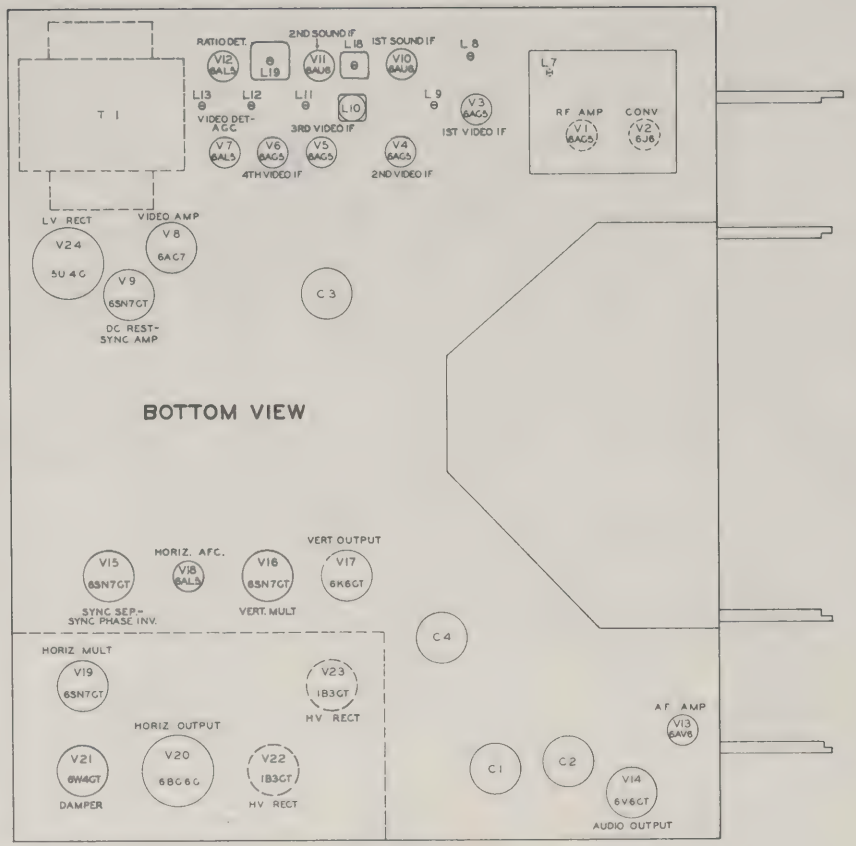
CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION




# TUBE PLACEMENT CHART

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

To eliminate the high voltage shock hazard remove the horizontal output tube (V20) from its socket.

**VIDEO IF ALIGNMENT**

Remove the converter tube (V2) from its socket and replace with a 6J6 with pin 1 removed to prevent erroneous indications.
Connect the negative terminal of a 3 volt battery to the junction of R25 and R26 and the positive terminal to chassis.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | Not used | 21.25MC (Unmod.) | Any | Use VTVM. DC Probe to Point (A). Common to Point (B). | A1, A2 | Adjust for MINIMUM deflection. |
| 2. | Direct | " | " | 22.4MC | " | " | A3 | Adjust for maximum deflection. |
| 3. | Direct | " | " | 24.6MC | " | " | A4 | " |
| 4. | Direct | " | " | 21.9MC | " | " | A5 | " |
| 5. | Direct | " | " | 25.8MC | " | " | A6 | " |
| 6. | Direct | " | 24MC (10MC SWP) | 21.25MC 22.25MC 25.75MC | " | Vert. Amp. to Point (A). Low side to Point (B). | A7, A8 | Adjust alternately for proper width and shape of response as shown in figure 1. If necessary SLIGHTLY retouch A3 thru A6 for proper response. |

**SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM**

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis. | 21.25MC (Unmod.) | Any | DC Probe to Point (C). Common to chassis. | A9, A10, A11 | Adjust for maximum deflection. |
| 8. | .01MFD | " | " | " | DC Probe to Point (D). Common to Point (E). | A12 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

**SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE**

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis. | 21.25MC (450KC Sweep) | 21.25MC | Any | Vert. Amp. to Point (C). Low side to chassis. | A9, A10, A11 | Disconnect stabilizer capacitor C5. Adjust for maximum amplitude and symmetry as per figure 2. |
| 8. | .01MFD | " | " | " | " | Vert. Amp. to Point (D). Low side to chassis. | A12 | Reconnect capacitor C5. Adjust A12 to place 21.25MC marker at center of crossover lines as per figure 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. |

**4.5MC TRAP ADJUSTMENT**

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 9. | .01MFD | High side to pin 4 (Grid) of 6AC7 (V8). Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe thru detector probe as shown in figure 4. Common to chassis. | A13 | Adjust for MINIMUM deflection. |

**RF AND MIXER ALIGNMENT**

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10. | Two 120Ω carbon res. | Across antenna terminals wtth 120Ω in each lead. | 207MC (10MC SWP) | 205.25MC 209.75MC | 12 | Vert. Amp. to Point (F). Low side to chassis. | A14, A15, A16 | Adjust for response curve similar to figure 5 with markers above 80%. |
| 11. | " | " | 213MC (10MC SWP) | 211.25MC 215.75MC | 13 | " | | Check all channels for response curve similar to figure 5. If markers fall below 70% on any channel make slight adjustment of A14, A15 and A16 with channel selector set for that channel. Recheck all channels to see that they have not been seriously effected. |
| | | | 201MC (10MC SWP) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC SWP) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC SWP) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC SWP) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC SWP) | 175.25MC 179.75MC | 7 | | | |
| | | | 85MC (10MC SWP) | 83.25MC 87.75MC | 6 | | | |
| | | | 79MC (10MC SWP) | 77.25MC 81.75MC | 5 | | | |
| | | | 69MC (10MC SWP) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC SWP) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC SWP) | 55.25MC 59.75MC | 2 | | | |

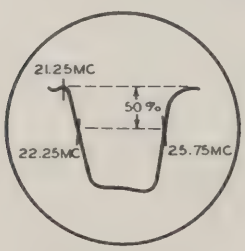


FIG. 1

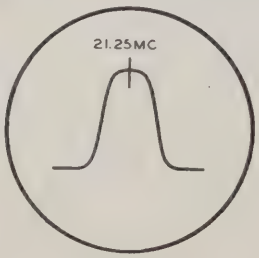


FIG. 2

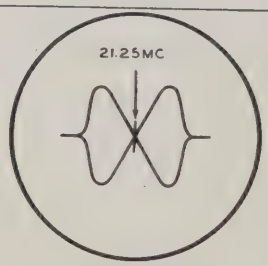


FIG. 3

# ALIGNMENT INSTRUCTIONS (CONT.)

## OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Set the fine tuning control to the mid-position of its range.
The signal generator output lead should be terminated with its characteristic impedance usually 50 ohms.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A17.
It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A17 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the individual channel oscillator adjustment for each channel that is off frequency. The individual channel oscillator adjustments are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 215.75MC (Unmod.) | 13 | DC Probe to Point D. Common to Point E. | A18 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |
| | | | 209.75MC | 12 | | A19 | |
| | | | 203.75MC | 11 | | A20 | |
| | | | 197.75MC | 10 | | A21 | |
| | | | 191.75MC | 9 | | A22 | |
| | | | 185.75MC | 8 | | A23 | |
| | | | 179.75MC | 7 | | A24 | |
| | | | 87.75MC | 6 | | A25 | |
| | | | 81.75MC | 5 | | A26 | |
| | | | 71.75MC | 4 | | A27 | |
| | | | 65.75MC | 3 | | A28 | |
| | | | 59.75MC | 2 | | A29 | |

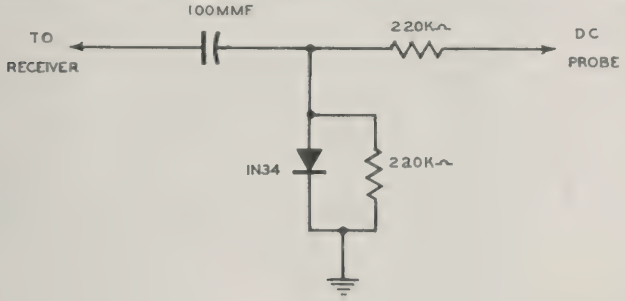


FIG.4

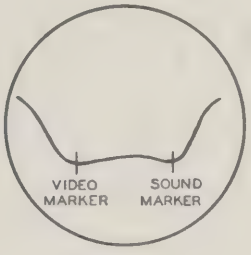
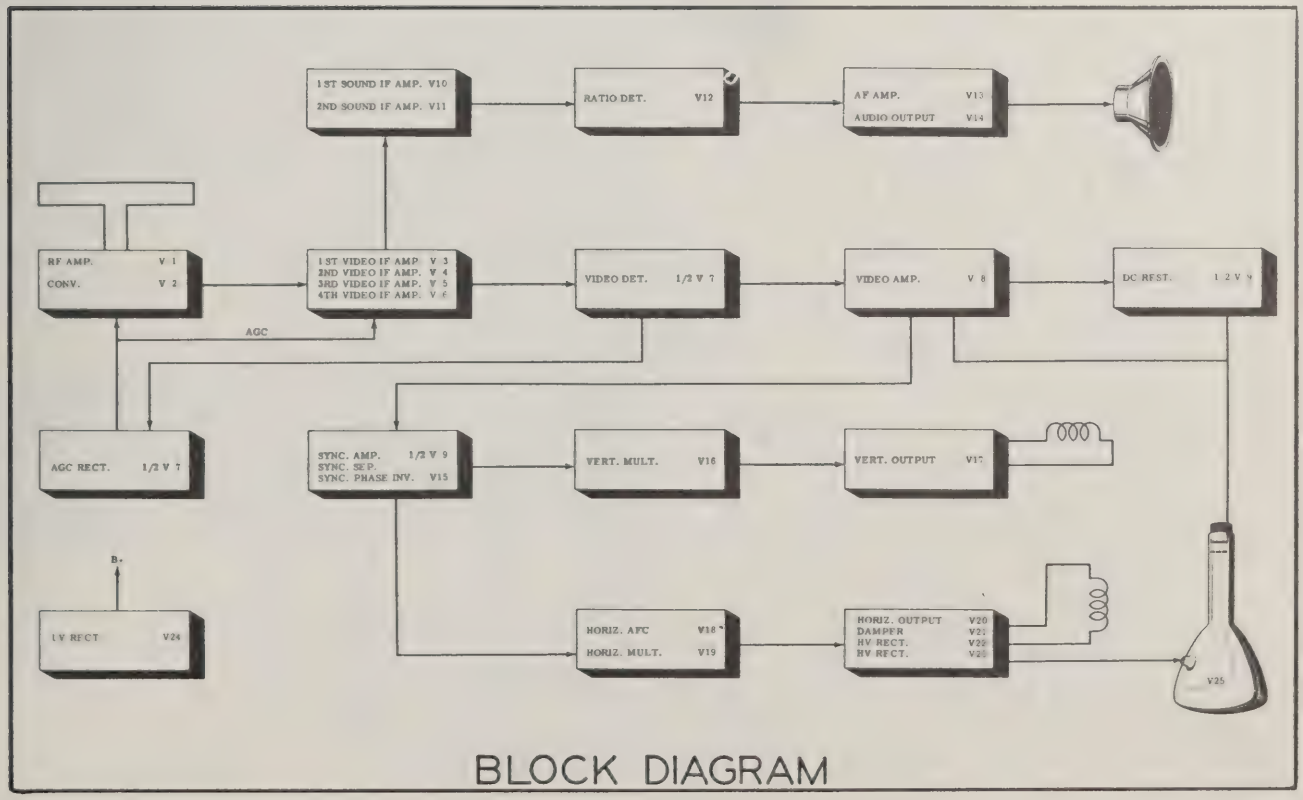


FIG.5



BLOCK DIAGRAM

# VOLTAGE AND RESISTANCE MEASUREMENTS

## VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | -.6VDC | 0V. | 6.3VAC | 0V. | 120VDC | 125VDC | 0V. | | |
| V 2 | 6J6 | 80VDC | 75VDC | 6.3VAC | 0V. | -1.8VDC | §-4.1VDC | 0V. | | |
| V 3 | 6AG5 | -.5VDC | .2VDC | 6.3VAC | 0V. | 120VDC | 140VDC | .2VDC | | |
| V 4 | 6AG5 | 0V. | 1.3VDC | 6.3VAC | 0V. | 135VDC | 140VDC | 1.3VDC | | |
| V 5 | 6AG5 | -1VDC | .2VDC | 6.3VAC | 0V. | 85VDC | 145VDC | .2VDC | | |
| V 6 | 6AG5 | 0V. | 1.8VDC | 6.3VAC | 0V. | 105VDC | 150VDC | 1.8VDC | | |
| V 7 | 6AL5 | 0V. | 1VDC | 0V. | 6.3VAC | 1.2VDC | 0V. | -.6VDC | | |
| V 8 | 6AC7 | 0V. | 6.3VAC | 0V. | .5VDC | .6VDC | 140VDC | 0V. | 205VDC | |
| V 9 | 6SN7GT | -.6VDC | 14VDC | 0V. | 60VDC | 60VDC | 70VDC | 6.3VAC | 0V. | |
| V 10 | 6AU6 | 0V. | 0V. | 0V. | 6.3VAC | 150VDC | 150VDC | 1.5VDC | | |
| V 11 | 6AU6 | 0V. | 0V. | 0V. | 6.3VAC | 150VDC | 150VDC | 1.5VDC | | |
| V 12 | 6AL5 | -1VDC | -.4VDC | 0V. | 6.3VAC | 0V. | 0V. | -1VDC | | |
| V 13 | 6AV6 | -.6VDC | 0V. | 6.3VAC | 0V. | 0V. | 0V. | 85VDC | | |
| V 14 | 6V6GT | 0V. | 0V. | 190VDC | 215VDC | 0V. | 0V. | 6.3VAC | 10VDC | |
| V 15 | 6SN7GT | 0V. | 90VDC | 2.6VDC | 0V. | 155VDC | 6.6VDC | 6.3VAC | 0V. | |
| V 16 | 6SN7GT | 0V. | 31VDC | 1.4VDC | -3.2VDC<br>-2.6VDC | 24VDC<br>15VDC | 1.4VDC | 6.3VAC | 0V. | |
| V 17 | 6K6GT | 0V. | 0V. | 220VDC | 260VDC<br>130VDC | 24VDC<br>15VDC | 0V. | 6.3VAC | 39VDC<br>55VDC | |
| V 18 | 6AL5 | 5.5VDC | -6.5VDC | 0V. | 6.3VAC | 0V. | 0V. | 0V. | | |
| V 19 | 6SN7GT | .1VDC | 320VDC | 13VDC | -3.9VDC<br>-3.2VDC | 145VDC | 13VDC | 0V. | 6.3VAC | |
| V 20 | 6BG6G | 0V. | 6.3VAC | 12VDC | 0V. | -11VDC | 0V. | 0V. | 280VDC | TOP CAP<br>* |
| V 21 | 6W4GT | 0V. | 0V. | 460VDC | 0V. | 355VDC | 0V. | ¶ | ¶ | |
| V 22 | 1B3GT | * DO NOT MEASURE. | | | | | | | | |
| V 23 | 1B3GT | * DO NOT MEASURE. | | | | | | | | |
| V 24 | 5U4G | 0V. | 350VDC | 0V. | 390VAC | 0V. | 390VAC | 0V. | 350VDC | |
| V 25 | 16JP4 | 0V. | 0V. | PIN 10<br>350VDC | PIN 11<br>60VDC | PIN 12<br>6.3VAC | | | | |

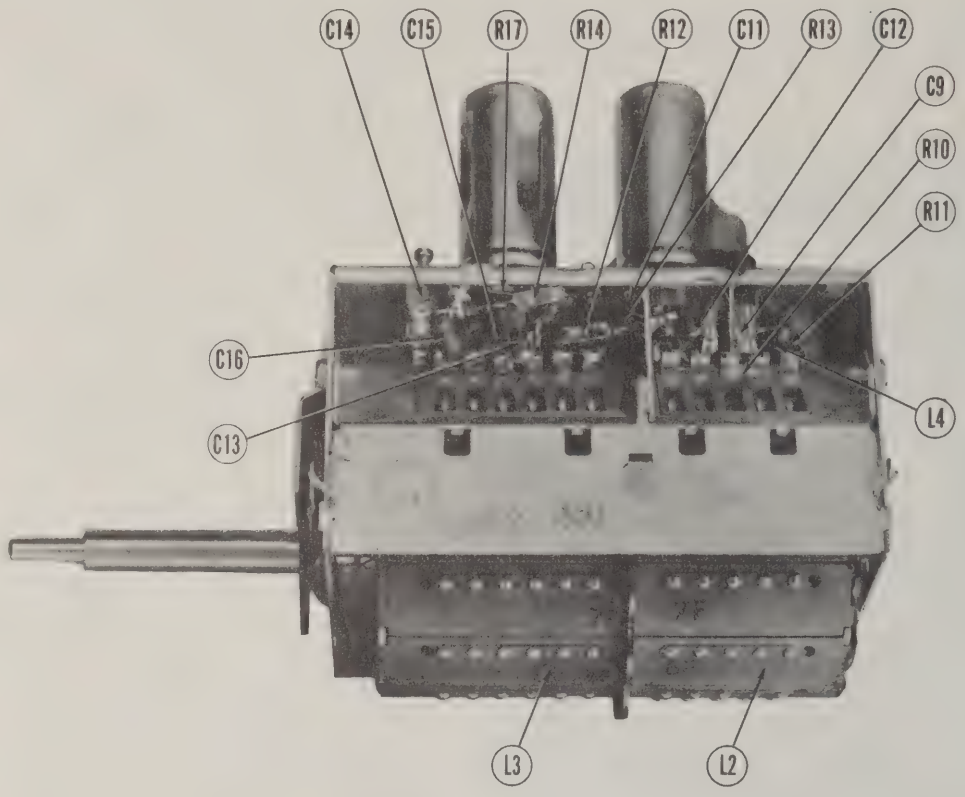
¶6.3VAC MEASURED ACROSS FILAMENTS.
* DO NOT MEASURE.
§ MEASURED WITH VACUUM TUBE VOLTMETER.

## RESISTANCE READINGS

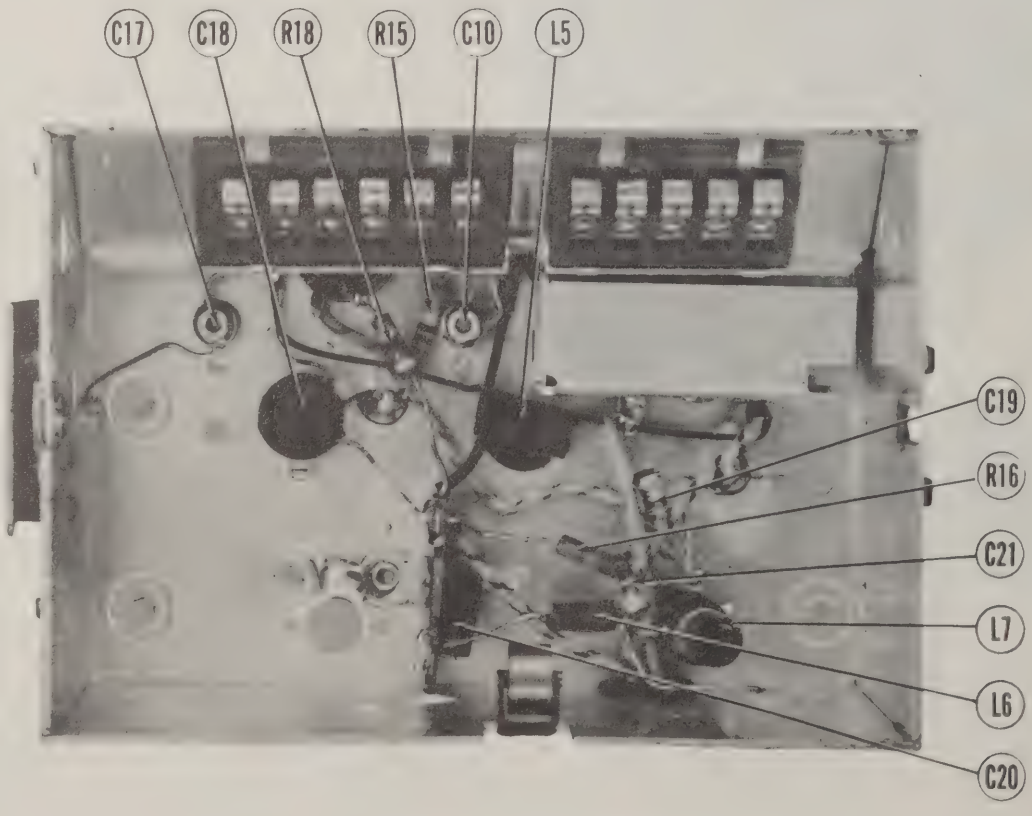
| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | 1.8 Meg. | 0Ω | .1Ω | 0Ω | †3.5KΩ | †.3.5KΩ | 0Ω | | |
| V 2 | 6J6 | †6.8KΩ | †17KΩ | .1Ω | 0Ω | 225KΩ | 10KΩ | 0Ω | | |
| V 3 | 6AG5 | 1.8 Meg. | 39Ω | .1Ω | 0Ω | †2.5KΩ | †2.5KΩ | 39Ω | | |
| V 4 | 6AG5 | 10KΩ | 82Ω | .1Ω | 0Ω | †2.4KΩ | †2.4KΩ | 82Ω | | |
| V 5 | 6AG5 | 1,7 Meg. | 39Ω | .1Ω | 0Ω | †8.3KΩ | †2.2KΩ | 39Ω | | |
| V 6 | 6AG5 | .7Ω | 150Ω | .1Ω | 0Ω | †7.6KΩ | †2KΩ | 150Ω | | |
| V 7 | 6AL5 | 0Ω | 470KΩ | 0Ω | .1Ω | 470KΩ | 0Ω | 560KΩ | | |
| V 8 | 6AC7 | 0Ω | .1Ω | 0Ω | 470KΩ | 1000Ω | †33KΩ | 0Ω | 4.5KΩ | |
| V 9 | 6SN7GT | 1 Meg. | †27KΩ | 0Ω | 500KΩ | 500KΩ | 30KΩ | .1Ω | 0Ω | |
| V 10 | 6AU6 | 0Ω | 0Ω | 0Ω | .1Ω | †2.7KΩ | †2.7KΩ | 150Ω | | |
| V 11 | 6AU6 | .1Ω | 0Ω | 0Ω | .1Ω | †2.7KΩ | †2.7KΩ | 150Ω | | |
| V 12 | 6AL5 | Inf. | Inf. | 0Ω | .1Ω | 0Ω | 0Ω | 20KΩ | | |
| V 13 | 6AV6 | 10 Meg. | 0Ω | .1Ω | 0Ω | 0Ω | 0Ω | †240KΩ | | |
| V 14 | 6V6GT | 0Ω | 0Ω | †2.4KΩ | †1.8KΩ | 525KΩ | 56KΩ | .1Ω | 250Ω | |
| V 15 | 6SN7GT | 2.2 Meg. | †23KΩ | 1000Ω | 3.9 Meg. | †9KΩ | 6.8KΩ | .1Ω | 0Ω | |
| V 16 | 6SN7GT | 60KΩ | †220KΩ | 2.2KΩ | 240KΩ<br>490KΩ | †2.2 Meg.<br>†2.3 Meg. | 2.2KΩ | .1Ω | 0Ω | |
| V 17 | 6K6GT | 0Ω | 0Ω | †2000Ω | †600Ω<br>†100KΩ | †2.2 Meg.<br>†2.3 Meg. | Inf. | .1Ω | 6.5KΩ<br>1.5KΩ | |
| V 18 | 6AL5 | Inf. | Inf. | 0Ω | .1Ω | 47KΩ | 0Ω | 47KΩ | | |
| V 19 | 6SN7GT | Inf. | ▲15KΩ | 1.5KΩ | 220KΩ<br>320KΩ | ▲230KΩ | 1.5KΩ | 0Ω | .1Ω | |
| V 20 | 6BG6G | Inf. | .1Ω | 100Ω | Inf. | 470KΩ | Inf. | 0Ω | †8.2KΩ | TOP CAP<br>▲86Ω |
| V 21 | 6W4GT | Inf. | Inf. | ▲0Ω | Inf. | †10Ω | Inf. | ▲0Ω | ▲.1Ω | |
| V 22 | 1B3GT | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP<br>▲120Ω |
| V 23 | 1B3GT | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP<br>Inf. |
| V 24 | 5U4G | Inf. | 8KΩ | Inf. | 135Ω | Inf. | 135Ω | Inf. | 8KΩ | |
| V 25 | 16JP4 | 0Ω | 24Ω | PIN 10<br>†0Ω | PIN 11<br>500KΩ | PIN 12<br>.1Ω | | | | |

FOCUS CONTROL SET FULLY COUNTERCLOCKWISE FOR THESE MEASUREMENTS.
† MEASURED FROM PIN 8 OF V24.
▲ MEASURED FROM PIN 3 OF V21.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

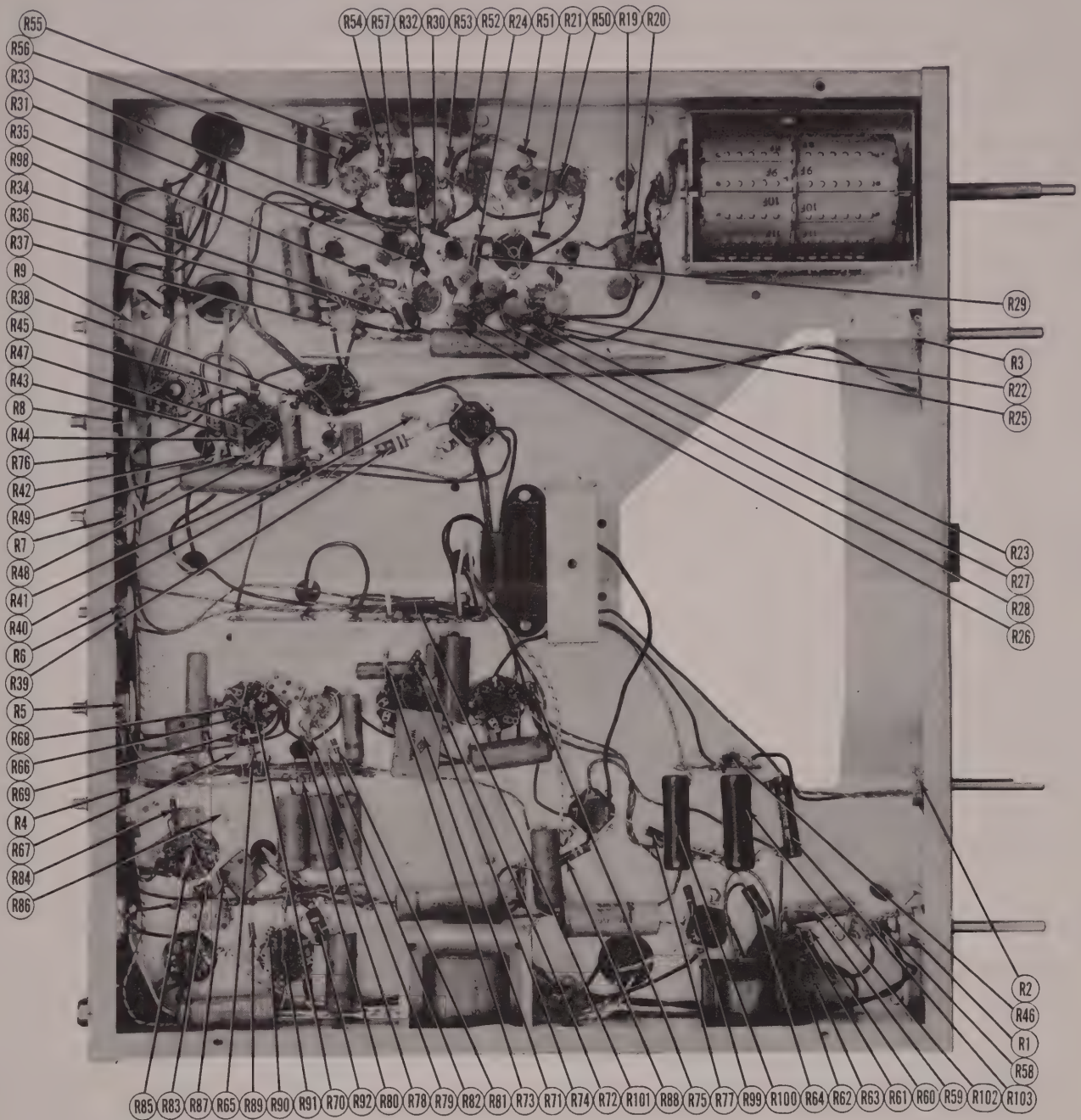



RF TUNER-RIGHT SIDE

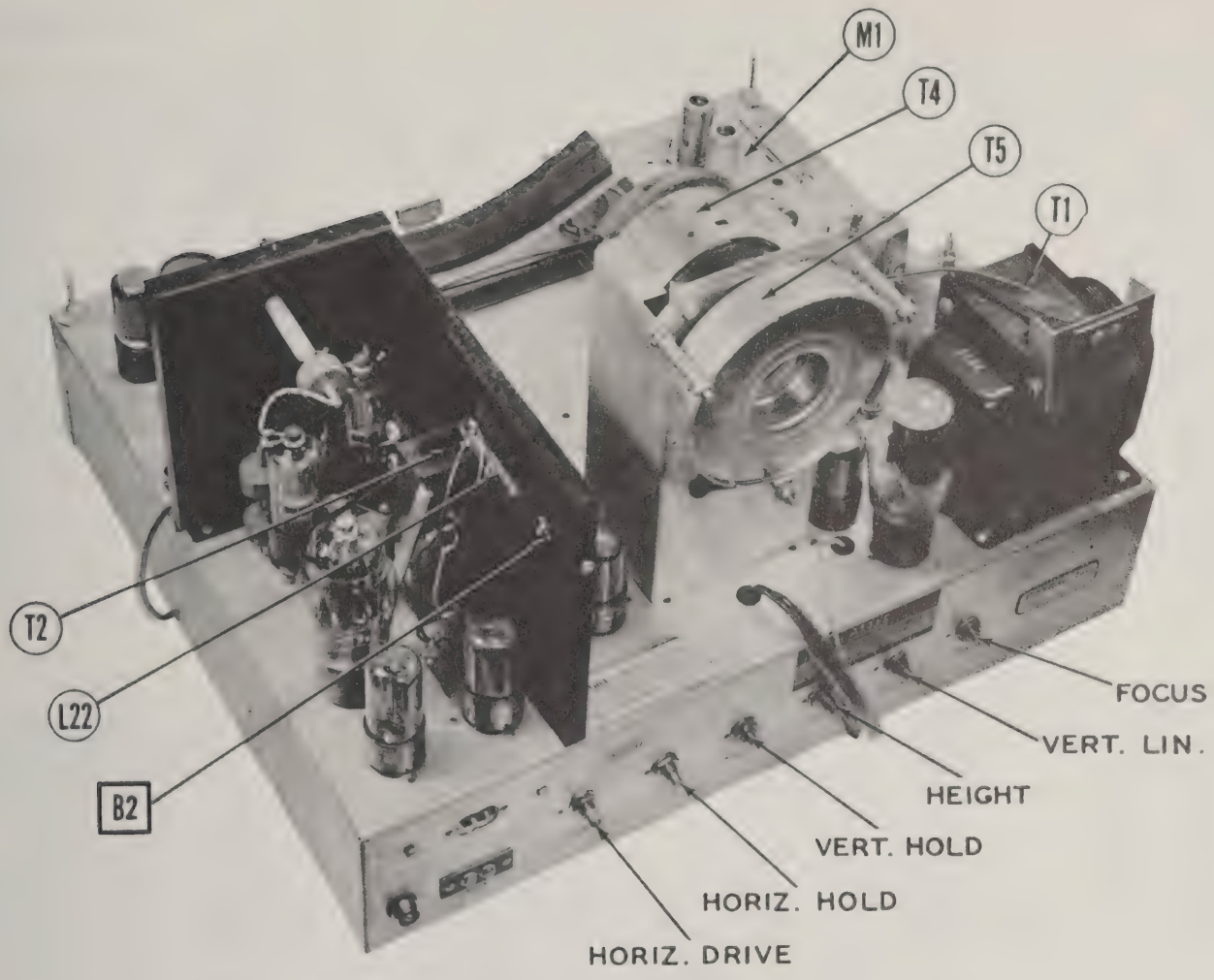



RF TUNER-BOTTOM VIEW

# CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




CHASSIS-TOP VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Adjust the width slug (B2) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B3) until the picture is symmetrical from left to right.

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: A LANSING PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | RF Amp. | | 6AG5 | 7BD | |
| V2 | Converter | | 6J6 | 7BF | |
| V3 | 1st Video IF | | 6AG5 | 7BD | |
| V4 | 2nd Video IF | | 6AG5 | 7BD | |
| V5 | 3rd Video IF | | 6AG5 | 7BD | |
| V6 | 4th Video IF | | 6AG5 | 7BD | |
| V7 | Video Det. -AGC | | 6AL5 | 6BT | |
| V8 | Video Amp. | | 6AC7 | 8N | |
| V9 | DC Rest. -Sync. Amp. | | 6SN7GT | 8BD | |
| V10 | 1st Sound IF | | 6AU6 | 7BK | |
| V11 | 2nd Sound IF | | 6AU6 | 7BK | |
| V12 | Ratio Det. | | 6AL5 | 6BT | |
| V13 | Audio Amp. | | 6AV6 | 7BT | |
| V14 | Audio Output | | 6V6GT | 7AC | |
| V15 | Sync. Sep. -Sync. Phase Inv. | | 6SN7GT | 8BD | |
| V16 | Vert. Mult. | | 6SN7GT | 8BD | |
| V17 | Vert. Output | | 6K6GT | 7S | |
| V18 | Hor. AFC | | 6AL5 | 6BT | |
| V19 | Hor Mult. | | 6SN7GT | 8BD | |
| V20 | Hor Output | | 6BG6G | 5BT | |
| V21 | Damper | | 6W4GT | 4CG | |
| V22 | HV Rect | | 1B3GT | 3C | |
| V23 | HV Rect | | 1B3GT | 3C | |
| V24 | LV Rect | | 5U4G | 5T | |
| V25 | Picture Tube | | 16JP4 | 12D | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: A LANSING PART No. | REPLACEMENT DATA: AEROVOX PART No. | REPLACEMENT DATA: CENTRALAB PART No. | REPLACEMENT DATA: CORNELL-DUBILIER PART No. | REPLACEMENT DATA: ERIE PART No. | REPLACEMENT DATA: SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 40 | 500 | | AF8K | | UP4050 | | TVL-8 | Filter |
| C2 | 80 | 500 | | AF8K | | UP4080 | | TVL-9 | Filter |
| C3A | 20 | 450 | | AF4444J | | UP222245 | | TVL-75 | ▲ Filter |
| B | 20 | 450 | | | | | | | ■ Filter |
| C | 20 | 450 | | | | | | | ▲ V. Amp. Screeen Byp. Filter |
| D | 20 | 450 | | | | | | | ▲ Decoupling |
| C4A | 20 | 450 | | AF4444J | | UP222245 | | TVL-75 | ▲ Decoupling |
| B | 20 | 450 | | | | | | | ■ Decoupling |
| C | 20 | 450 | | | | | | | ▲ Decoupling |
| D | 20 | 450 | | | | | | | Vert. Output Decoup. |
| C5 | 5 | 50 | | PRS150/4 | | BR550 | | TVA-13 | Stabilizing Cap. |
| C6 | 25 | 50 | | PRS50/25 | | BR255A | | TVA-15 | Output Cathode Byp. |
| C7 | 50 | 50 | | PRS50/50 | | BR505 | | TVA-16 | Vert. Output Cath. Byp. |
| C8 | 5 | | | SI5DNPO | D2-4.7 | | NPOK-5 | | Fixed Trimmer * |
| C9 | 5-3 | | | | 829-3 | | | | Variable Trimmer |
| C10 | 5-3 | | | | 829-3 | | | | Variable Trimmer |
| C11 | 120 | | | GP120K | DN-120 | | GP2K-120 | | RF Decoup. |
| C12 | 1000 | | | GP1000M | D6-102 | | 811-001 | 29C4 | RF Fil. Bypass |
| C13 | 100 | | | SL100N750 | DN-100 | | N750L-100 | | RF Coupling |
| C14 | 5-3 | | | | 829-3 | | | | Variable Trimmer |
| C15 | 20 | | | SI20KNPO | D2-20 | | NPOK-20 | | Osc. Grid Cap. |
| C16 | 10 | | | SL10DN750 | DN-10 | | N750K-10 | | Fixed Trimmer |
| C17 | 5-3 | | | | 829-3 | | | | Variable Trimmer |
| C18A | 1000 | | | GP1000M | D6-102 | | 882-2 x 0015 | 29C7 | Conv. Filament Bypass |
| B | 1000 | | | GP1000M | D6-102 | | | | RF Bypass |
| C19 | 10 | | | CN10DNPO | D2-10 | | NPOK-10 | | Fixed Trimmer |
| C20 | 72 | 300 | | | | | | | Fixed Trimmer |
| C21 | 300 | | | GP300M | D6-301 | | GP2K-300 | | IF Coupling |
| C22 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AGC Filter |
| C23 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | RF Bypass |
| C24 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st V. IF Fil. Byp. |
| C25 | 330 | | | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | IF Coupling |
| C26 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd V. IF Decoupling |
| C27 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd V. IF Fil. Byp. |
| C28 | 330 | | | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | IF Coupling |
| C29 | 47 | | | CN47JNPO | D2-47 | | NPOM-47 | | Fixed Trimmer |
| C30 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | [illegible] | AGC Filter |
| C31 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | [illegible] | 3rd V. IF Decoupling |
| C32 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 3rd V. IF Fil. Byp. |
| C33 | 330 | | | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | IF Coupling |
| C34 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 4th V. IF Decoupling |
| C35 | 82 | | | GP100M | D2-82 | 5W5T1 | GP1K-82 | 1FM-31 | 4th V. IF Cath. Byp. |
| C36 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | [illegible] | 4th V. IF Fil. Byp. |
| C37 | 100 | 300 | | GP100M | D2-100 | 5R5T1 | NPOM-100 | MS-31 | Fixed Trimmer |
| C38 | 330 | | | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | IF Coupling |
| C39 | 100 | | | GP100M | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | IF Coupling |
| C40 | .1 | 600 | | P688-1 | | PTE6P1 | | TM-1 | AGC Filter |
| C41 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | V. Det.-AGC Fil. Byp. |
| C42 | 2 | | | SI2DNPO | D2-2.2 | | NPOK-3 | | |
| C43 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | RF Bypass |
| C44 | .1 | 600 | | P688-1 | | PTE6P1 | | TM-1 | RF Bypass |
| C45 | 50 | 500 | | 1469-00005 | D2-51 | 5R5Q5 | NPOM-50 | MS-45 | Fixed Trimmer |
| C46 | .1 | 600 | | P688-1 | | PTE6P1 | | TM-1 | Video Coupling |
| C47 | .1 | 600 | | P688-1 | | PTE6P1 | | TM-1 | Pic. Tube Grid Filter * |
| C48 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st S. IF Decoup. |
| C49 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd S. IF Decoup. |
| C50 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd S. IF Cath. Byp. |
| C51 | 82 | | | GP100M | D2-82 | 5W5T1 | GP1K-100 | 1FM-31 | Diode Load Cap. |
| C52 | 4000 | | | GP4000M | | PTE6D4 | GP2M-004 | 1FM-24 | De-emphasis |
| C53 | .02 | 600 | | P688-02 | | PTE6S2 | | TM-12 | Audio Coupling |
| C54 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Audio Coupling |
| C55 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C56 | 4000 | | | GP4000M | | PTE6D4 | GP2M-004 | 1FM-24 | Output Plate Byp. |
| C57 | .02 | 600 | | P688-02 | | PTE6S2 | | TM-12 | Sync. Coupling |

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: A LANSING PART No. | REPLACEMENT DATA: AEROVOX PART No. | REPLACEMENT DATA: CENTRALAB PART No. | REPLACEMENT DATA: CORNELL-DUBILIER PART No. | REPLACEMENT DATA: ERIE PART No. | REPLACEMENT DATA: SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C58 | .02 | 600 | | P688-02 | | PTE6S2 | | TM-12 | Sync. Coupling |
| C59 | 100 | | | GP100M | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Sync. Coupling |
| C60A | 10000 | | | GP10000M | D6-103 | PTE6S1 | 811-01 | TM-11 | Vert. Sync. Coupling |
| B | 2000 | | | GP2000M | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Integrator Net. |
| C | 5000 | | | GP5000M | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| D | 5000 | | | GP5000M | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| C61 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Vert. MV Feedback |
| C62 | 6000 | 500 | | 1467-006 | D6-562 | 1D5D6 | 811-005 | 1FM-26 | Vert. MV Grid Cap. |
| C63 | .05 | 600 | | P688-05 | | PTE6S5 | | TM-15 | Vert. Discharge |
| C64 | 500 | 500 | | 1468-0005 | D6-501 | 5W5T5 | GP2K-500 | 1FM-35 | Hor. Sync. Coupling |
| C65 | 500 | 500 | | 1468-0005 | D6-501 | 5W5T5 | GP2K-500 | 1FM-35 | Hor. Sync. Coupling |
| C66 | 5000 | | | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AFC Filter |
| C67 | .05 | 600 | | P688-05 | | PTE6S5 | | TM-15 | AFC Filter |
| C68 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | AFC Filter |
| C69 | 6000 | 500 | | 1467-006 | | 1D5D6 | | 1FM-26 | Fixed Trimmer |
| C70 | 270 | 500 | | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Hor. MV Feedback |
| C71 | 270 | 500 | | 1469-00025 | D6-271 | 5R5T25 | GP2K-270 | MS-325 | Hor. Discharge |
| C72 | 150 | 500 | | 1469-00015 | D6-151 | 5R5T15 | GP2K-150 | MS-315 | Hor. Discharge * |
| C73 | 2000 | 500 | | 1467-002 | D6-202 | 1W5D2 | GP2M-002 | 1FM-22 | Hor. Sweep Coup. |
| C74 | .05 | 600 | | P688-05 | | PTE6S5 | | TM-15 | Hor. Output Screen Byp. |
| C75 | .1 | 600 | | P688-1 | | PTE6P1 | | TM-1 | Hor. Output Cath. Byp. |
| C76 | .035 | 600 | | P688-033 | | | | | Fixed Trimmer * |
| C77 | .05 | 600 | | [illegible] | | PTE6S5 | | TM-15 | Hor. Feedback |
| C78 | .01 | 600 | | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Fixed Trimmer * |
| C79 | .2 | 600 | | 684-2 | | GT6P2 | | TC-2 | Damper Filter |
| C80 | .05 | 600 | | P688-05 | | PTE6S5 | | TM-15 | Damper Filter |
| C81 | .25 | 600 | | 684-25 | | GT6P25 | | TC-2 | Damper Filter |
| C82 | 500 | 10000 | | HV20B | TV2-501 | | | | Voltage Doubler Cap. |
| C83 | 500 | 10000 | | HV20B | TV2-501 | | | | HV Filter |
| C84 | 500 | 10000 | | | TV3-501 | | | | HV Filter |

* Not used in all models.

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: A. LANSING PART No. | REPLACEMENT DATA: IRC PART No. | REPLACEMENT DATA: CLAROSTAT PART No. | REPLACEMENT DATA: CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 500KΩ | ½ | | Q13-133 | M-60-Z | B-60-S | Volume control |
| B | Switch | | | 76-1 | SW-A | Not Req. | Attach to R1A per instructions |
| R2 | 500KΩ | ½ | | Q11-133 | M-58-S | B-59 | Brightness control |
| R3 | 1000Ω | ½ | | | | | Contrast control |
| R4 | 1500Ω | 3 | | | 43-1500 | | Horiz. linearity control-Wire Wound |
| R5A | 100KΩ | ½ | | Q11-128 | AM-49-S | AN-40 | Horiz. hold control |
| B | Shaft | | | Not Req. | RS-2 | AK-1 | Attach to R5A per instructions |
| R6A | 250KΩ | ½ | | Q11-130 | M-55-S | AN-50 | Vert. hold control |
| B | Shaft | | | Not Req. | RS-2 | AK-1 | Attach to R6A per instructions |
| R7A | 100KΩ | ½ | | Q11-128 | M-49-S | AN-40 | Height control |
| B | Shaft | | | Not Req. | Not Req. | AK-1 | Attach to R7A per instructions |
| R8 | 5000Ω | 2 | | W-5000 | 43-5000 | V-135 | Vert. linearity control-Wire Wound-See note 1 |
| R9 | 2000Ω | 4 | | | 58-2000 | V-131 | Focus control-Wire Wound |

Note 1. Some models use 300Ω contr ol.

## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: A. LANSING PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED. |
|---|---|---|---|---|---|
| R10 | 3900Ω | ½ | | BTS-3900 | Ant. Coil Shunt |
| R11 | 47KΩ 20% | ½ | | BTS-47K | AGC Network |
| R12 | [illegible] | ½ | | BTS-10K | RF Plate Coil Shunt |
| R13 | 2200Ω 20% | ½ | | BTS-2200 | RF Decoupling |
| R14 | 4700Ω | ½ | | BTS-4700 | Conv. Grid |
| R15 | 220KΩ 20% | ½ | | BTS-220K | Conv. Grid |
| R16 | 15KΩ 20% | ½ | | BTS-15K | Conv. Plate Decoupling |
| R17 | 10KΩ | ½ | | BTS-10K | Osc. Grid |
| R18 | 4700Ω | ½ | | BTS-4700 | Osc. Plate |
| R19 | 10KΩ 5% | 1 | | | 1st Video IF Grid |
| R20 | 39Ω | 1 | | | 1st Video IF Cathode |
| R21 | 150Ω 20% | 1 | | | 1st Video IF Decoupling |
| R22 | 10KΩ 5% | 1 | | | 2nd Video IF Grid |
| R23 | 82Ω 20% | 1 | | | 2nd Video IF Cathode |
| R24 | 150Ω 20% | 1 | | | 2nd Video IF Decoupling |
| R25 | 1000Ω 20% | 1 | | BTS-1000 | AGC Network |
| R26 | 1000Ω 20% | 1 | | BTS-1000 | AGC Network |
| R27 | 4700Ω 5% | 1 | | | 3rd Video IF Grid |
| R28 | 39Ω | 1 | | | 3rd Video IF Cathode |
| R29 | 5600Ω 5% | 1 | | | 3rd Video IF Plate |
| R30 | 150Ω 20% | 1 | | | 3rd Video IF Decoupling |
| R31 | 150Ω 20% | 1 | | | 4th Video IF Cathode |
| R32 | 5600Ω 5% | 1 | | | 4th Video IF Plate |
| R33 | 150Ω 20% | 1 | | | 4th Video IF Decoupling |
| R34 | 1.2 Meg. 20% | ½ | | BTS-1.2 Meg. | AGC Network |
| R35 | 560KΩ | ½ | | BTS-560K | AGC Rect. Diode Load-See Note 2 |
| R36 | 2700Ω 5% | 1 | | BTS-2700-5% | Video Det. Diode Load-See Note 3 |
| R37 | 470KΩ | ½ | | BTS-470K | Voltage Divider |
| R38 | 10KΩ 20% | 1 | | BTS-10K | Peaking Coil Shunt-See Note 4 |
| R39 | 3900Ω | 2 | | BT-2-3900 | Video Amp. Plate-See Note 5 |
| R40 | 33KΩ 20% | ½ | | BTS-33K | Video Amp. Screen |
| R41 | 10KΩ 20% | ½ | | BTS-10K | Isolation |
| R42 | 10KΩ 20% | ½ | | BTS-10K | Picture Tube Cathode |
| R43 | 470KΩ | ½ | | BTS-470K | DC Rest. Load |
| R44 | 56KΩ | ½ | | BTS-56K | DC Rest. Load |
| R45 | [illegible] | ½ | | BTS-68K | Voltage Divider |
| R46 | 1 Meg. 20% | ½ | | BTS-1 Meg. | Voltage Divider-See Note 6 |

## RESISTORS (CONT.)

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: A. LANSING PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R47 | 1 Meg. 20% | ½ | | BTS-1 Meg. | Sync. Amp. Grid |
| R48 | 220KΩ | ½ | | BTS-220K | Sync. Amp. Plate |
| R49 | 22KΩ | 1 | | BTS-22K | Voltage Divider |
| R50 | 150Ω 20% | ½ | | | 1st Sound IF Cathode |
| R51 | 1000Ω 20% | ½ | | BTS-1000 | 1st Sound IF Decoupling |
| R52 | 150Ω 20% | ½ | | | 2nd Sound IF Cathode |
| R53 | 1000Ω 20% | ½ | | BTS-1000 | 2nd Sound IF Decoupling |
| R54 | 270Ω | ½ | | | Balancing |
| R55 | 10KΩ 20% | ½ | | BTS-10K | Ratio Det. Diode Load |
| R56 | 10KΩ 20% | ½ | | BTS-10K | Ratio Det. Diode Load |
| R57 | 22KΩ 20% | ½ | | BTS-22K | De-emphasis |
| R58 | 10 Meg. 20% | ½ | | BTS-10 Meg. | AF Amp. Grid |
| R59 | 240KΩ | ½ | | BTS-220K | AF Amp. Plate |
| R60 | 2.2 Meg. | ½ | | BTS-2.2 Meg. | Feedback |
| R61 | 470KΩ | ½ | | BTS-470K | Output Grid |
| R62 | 56KΩ | ½ | | BTS-56K | Output Grid |
| R63 | 250Ω | ½ | | | Output Cathode |
| R64 | 1000Ω 20% | 2 | | BT-2-1000 | Decoupling |
| R65 | 2.2 Meg. | ½ | | BTS-2.2 Meg. | Sync. Sep. Grid |
| R66 | 1000Ω 20% | ½ | | BTS-1000 | Sync. Sep. Cathode |
| R67 | 22KΩ 20% | ½ | | BTS-22K | Sync. Sep. Plate |
| R68 | 3.9 Meg. | ½ | | BTS-3.9 Meg. | Sync. Phase Inv. Grid |
| R69 | 6800Ω | ½ | | BTS-6800 | Sync. Phase Inv. Cathode |
| R70 | 6800Ω | ½ | | BTS-6800 | Sync. Phase Inv. Plate |
| R71A | 22KΩ | ½ | | BTS-22K | Voltage Divider |
| B | 22KΩ | ½ | | BTS-22K | Integrator Network |
| C | 8200Ω | ½ | | BTS-8200 | Integrator Network |
| D | 8200Ω | ½ | | BTS-8200 | Integrator Network |
| R72 | 2200Ω 20% | ½ | | BTS-2200 | Vert. MV Cathode |
| R73 | 220KΩ | ½ | | BTS-220K | Vert. MV Plate |
| R74 | 240KΩ 20% | ½ | | BTS-220K | Vert. MV Grid |
| R75 | 2.2 Meg. | ½ | | BTS-2.2 Meg. | Vert. MV Plate |
| R76 | 1500Ω 20% | ½ | | BTS-1500 | Vert. Output Cathode |
| R77 | 500Ω 20% | 1 | | BTA-470 | Vert. Output Decoupling -See Note 7 |
| R78 | 100KΩ 20% | ½ | | BTS-100K | Horiz. AFC Disc. Load |
| R79 | 100KΩ 20% | ½ | | BTS-100K | Horiz. AFC Disc. Load |
| R80 | 470KΩ | ½ | | BTS-470K | Horiz. AFC Filter Network |
| R81 | 47KΩ 20% | ½ | | BTS-47K | Feedback Network |
| R82 | 4700Ω 20% | ½ | | BTS-4700 | Feedback Network |
| R83 | 1500Ω 5% | ½ | | BTS-1500-5% | Horiz. MV Cathode |
| R84 | 4700Ω 5% | ½ | | BTS-4700-5% | Horiz. MV Plate |
| R85 | 220KΩ | ½ | | BTS-220K | Horiz. MV Grid |
| R86 | 220KΩ | ½ | | BTS-220K | Horiz. MV Plate |
| R87 | 3900Ω 5% | ½ | | BTS-3900-5% | Horiz. Peaking |
| R88 | 10KΩ | 1 | | BTA-10K | Filter |
| R89 | 150Ω 20% | ½ | | | Parasitic Supp. |
| R90 | 470KΩ | ½ | | BTS-470K | Horiz. Output Grid |
| R91 | 100Ω 20% | 2 | | BW-2-100 | Horiz. Output Cathode |
| R92 | 820Ω | 2 | | BT-2-8200 | Horiz. Output Screen-See Note 8 |
| R93 | 4.7Ω | ½ | | | HV Rect. Filament-Wire Wound |
| R94 | 4.7Ω | ½ | | | HV Rect. Filament-Wire Wound |
| R95 | 2.2 Meg. 80% | 2 | | | HV Rect. Load |
| R96 | 2.2 Meg. 20% | 2 | | | HV Rect. Load |
| R97 | 470KΩ | ½ | | | HV Filter |
| R98 | 10Ω | ½ | | | Surge Limiter-Wire Wound |
| R99 | 10Ω | ½ | | BW-½-10 | Filter Network-Wire Wound |
| R100 | 500Ω | 20 | | DG-500 | Filter Network-Wire Wound-See Note 9 |
| R101 | 100Ω 20% | 1 | | BW-1-100 | Focus Coil Shunt-See Note 10 |
| R102 | 1000Ω | 20 | | DG-1000 | Filter-Wire Wound |
| R103 | 7500Ω | 10 | | AB-7500 | Bleeder-Wire Wound-See Note 11 |

Note 2. Some models use 470KΩ resistor in this application.
Note 3. Some models use 4700Ω resistor in this application.
Note 4. Not used in all models.
Note 5. Some models use 3300Ω resistor in this application.
Note 6. Some models use 560KΩ resistor in this application.
Note 7. Some models use 470Ω resistor in this application.
Note 8. Some models use 7500Ω resistor in this application.
Note 9. Some models use 700Ω, 20 watt resistor in this application.
Note 10. Some models use 270Ω resistor in this application.
Note 11. Some models use 10KΩ, 10 watt resistor in this application.

## TRANSFORMER (POWER)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: ALTEC LANSING PART No. | REPLACEMENT DATA: STANCOR PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: CHICAGO PART No. |
|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC ② 2.2A | 720VCT .275ADC | 5VAC ② 3A | 6.3VAC ② 1.2A SEC. 4 6.3VAC ② 9A | | P-6135 P-6134 ④ | P-3169 | TP-360 ③ |

④ Mount under chassis and use for SEC. 4
③ Use universal mounting bracket.

ALTEC LANSING
MODELS ALC-205, ALC-206

# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING DC RESISTANCE PRI. | RATING DC RESISTANCE SEC. | REPLACEMENT DATA ALTEC LANSING PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| T2 | 120Ω Tap ② 76Ω | 5.7Ω Tap ② .5Ω<br>SEC. 2 0Ω<br>SEC. 3 0Ω | | A-8119 | HVO-5 | TFB-4 | Hor. Output Trans. |
| T3 | 1000Ω | 13Ω | | A-8112 | A-3035 ② | TSO-5 ① | Vert. Output Trans. |
| T4A | 11Ω | | | DY-7 | MD-12 | | Hor. Deflection Coil |
| B | 62Ω | | | | | | Vert. Deflection Coil |
| T5 | 420Ω | | | | | MF-2 | Focus Coil |

① Drill one new mounting hole.
② Drill new mounting holes.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING IMPEDANCE PRI. | RATING IMPEDANCE SEC. | RATING DC RES. PRI. | RATING DC RES. SEC. | REPLACEMENT DATA A. LANSING PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T6 | 10.6KΩ | 8Ω | 575Ω | .7Ω | | A-3823 | A-3019 | RO-16 ① | ① Drill one new mounting hole. |

## FILTER CHOKE

| ITEM No. | RATINGS TOTAL DIRECT CURRENT | RATINGS D.C. RESISTANCE | RATINGS INDUCTANCE (0 CURRENT 1000 ∿) | REPLACEMENT DATA A. LANSING PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | .275ADC | 77Ω | 4.5 Henries | | C-2326 ① | C-2996 ① | TR-3300① | ① Drill one new mounting hole. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA ALTEC LANSING PART No. | REPLACEMENT DATA MEISSNER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L2 | Ant. Coil | 0Ω | 0Ω | | | |
| L3 | RF, Mixer Grid & Osc. | 0Ω | | | | |
| L4 | Fil. Choke | 1Ω | | | | |
| L5 | Fil. Choke | 1Ω | | | | |
| L6 | RF Choke | .5Ω | | | | |
| L7 | 1st Video IF | .7Ω | | | | |
| L8 | 1st Video IF Coupling | .7Ω | | | | |
| L9 | 2nd Video IF | .7Ω | | | | |
| L10 | 3rd Video IF | .3Ω | .1Ω | | | Sound take off |
| L11 | 4th Video IF | 7Ω | | | | |
| L12 | 4th Video IF Cath. Trap | .1Ω | .1Ω | | | |
| L13 | 5th Video IF | .7Ω | | | | |
| L14 | Peaking | 7Ω | | | | Red identification dot |
| L15 | Peaking | 11Ω | | | | |
| L16 | 4.5MC Trap | 1.5Ω | | | | |
| L17 | Peaking | 12.5Ω | | | | Green identification dot |
| L18 | Sound IF | .2Ω | .2Ω | | | |
| L19 | Ratio Det. Trans. | .1Ω | .1Ω | | | |
| L20 | Horiz. Freq. | 36Ω | | | | |
| L21 | Horiz. Lin. | 6.1Ω | | | | |
| L22 | Horiz. Size | .5Ω | | | | |

## MISCELLANEOUS

| ITEM No. | PART NAME | ALTEC LANSING PART No. | NOTES |
|---|---|---|---|
| M1 | RF Tuner | | |
| M2 | Ion Trap | | |

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**HALLICRAFTERS MODELS**
**745, 750, 751, 760, 761**

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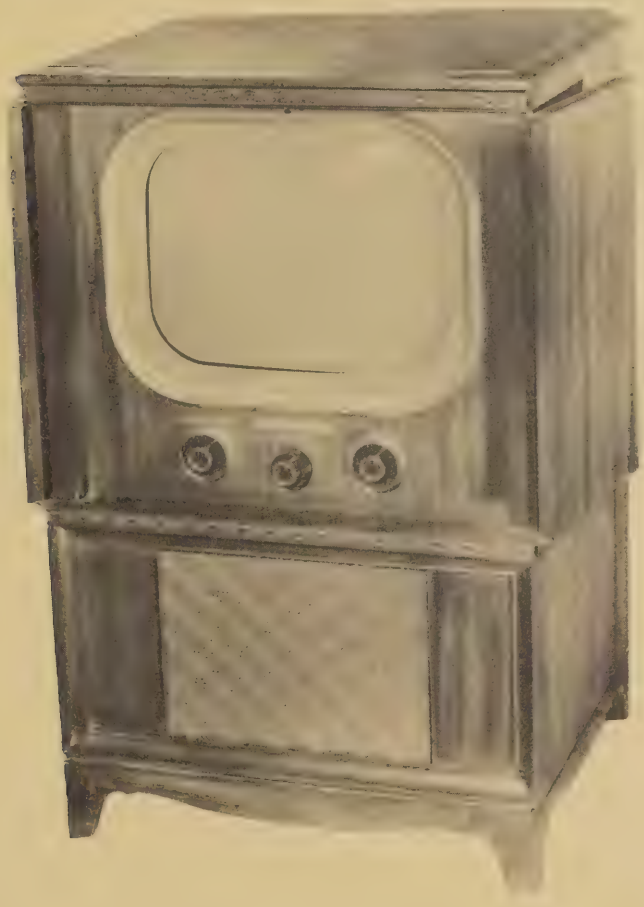

**MODEL 760**

**HALLICRAFTERS MODELS**
**745, 750, 751, 760, 761**

**HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana**

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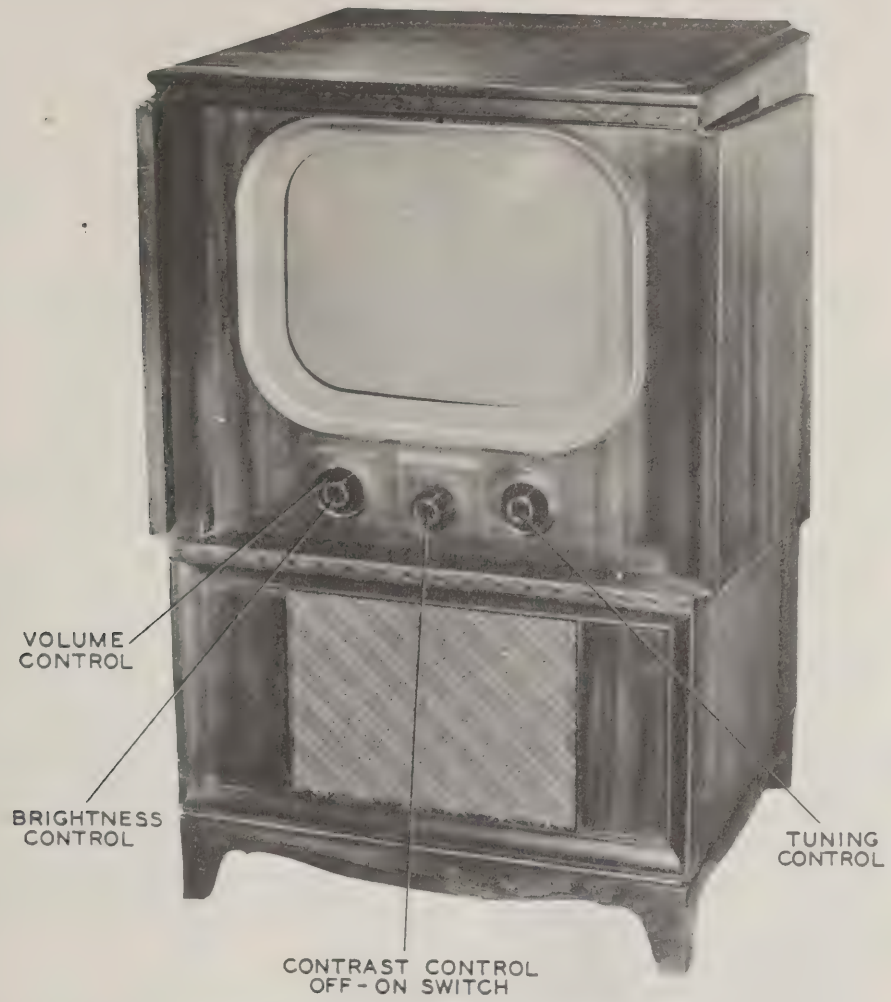


HALLICRAFTERS
MODELS 745, 750, 751, 760, 761

HALLICRAFTERS MODEL 760

| | |
|---|---|
| TRADE NAME | Hallicrafters, Models 745, 750, 751, 760, 761 |
| MANUFACTURER | The Hallicrafters Co., 5th and Kostner Ave., Chicago 24, Illinois |
| TYPE SET | Television Receiver |
| TUBES | Twenty-One |
| POWER SUPPLY | 105-125 Volts AC 60 Cycle — RATING 1.7 Amp. at 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 |

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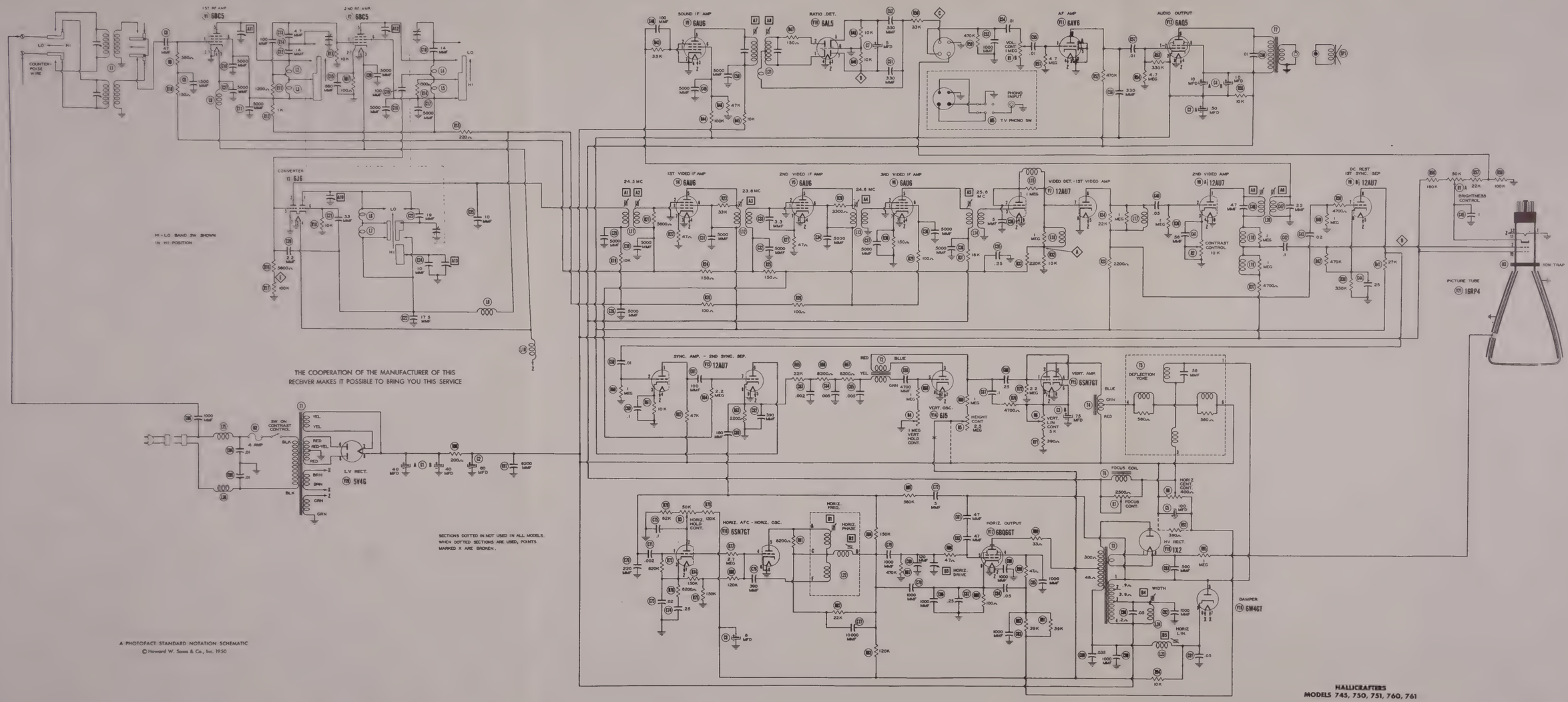


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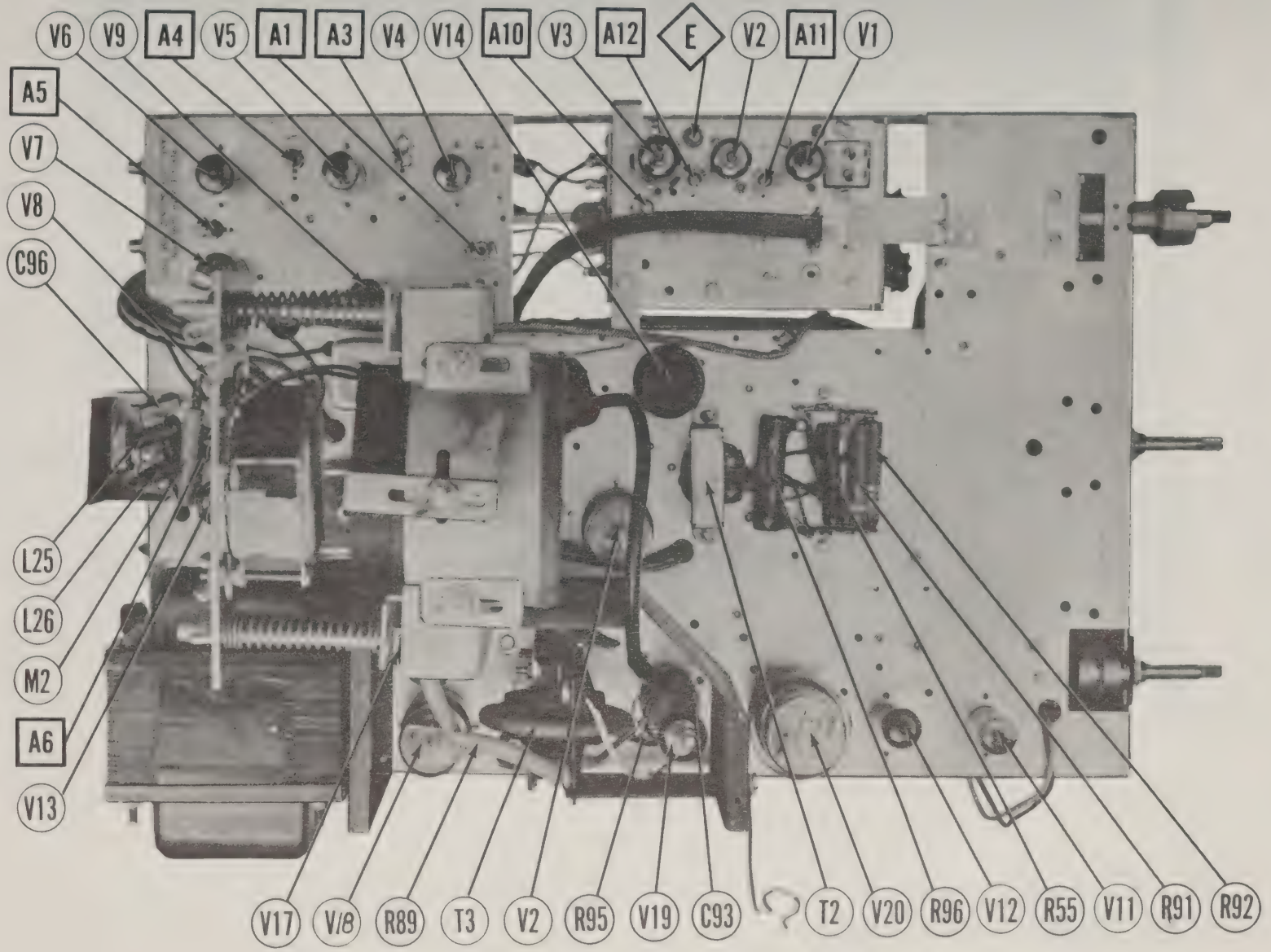
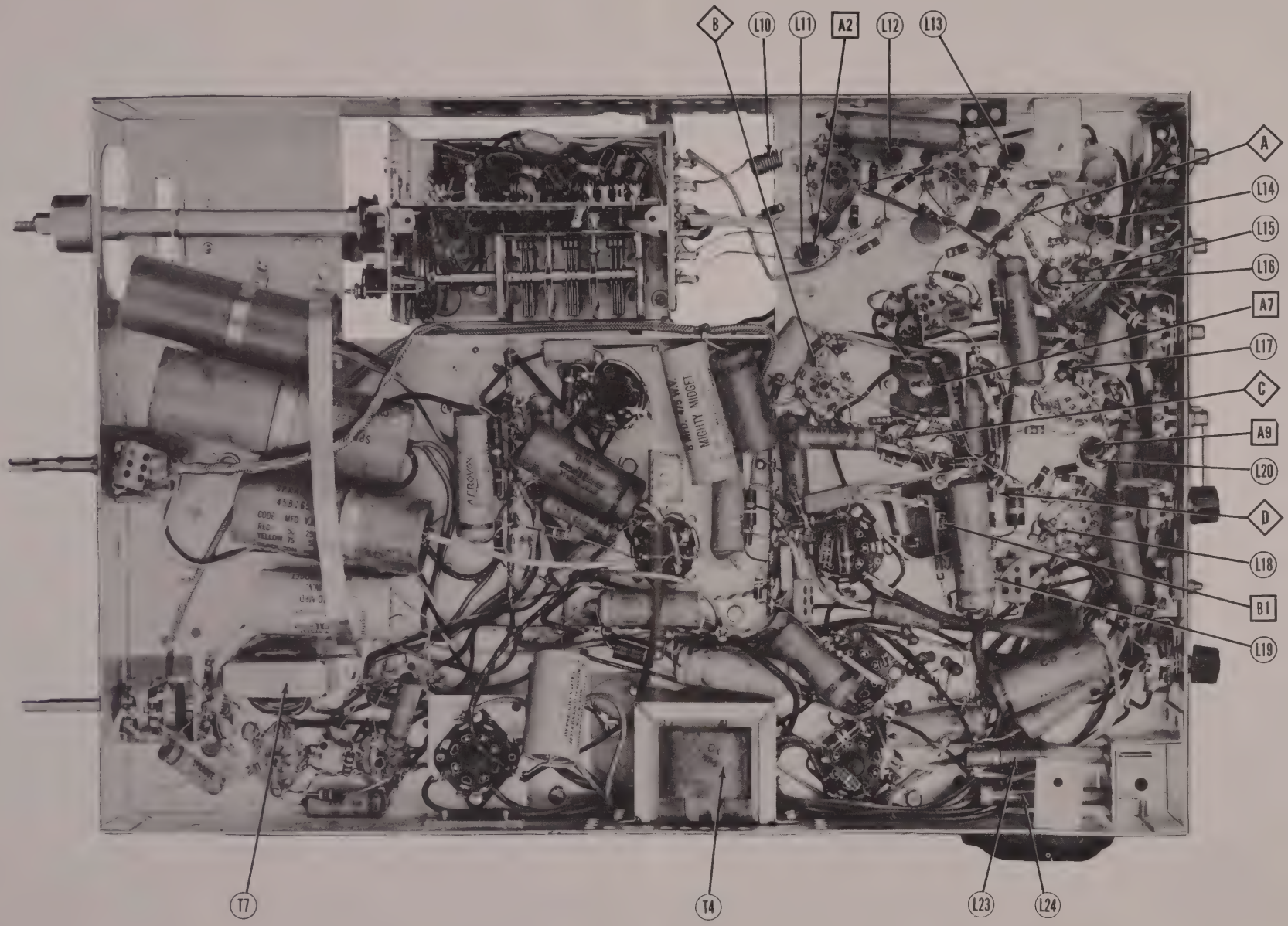
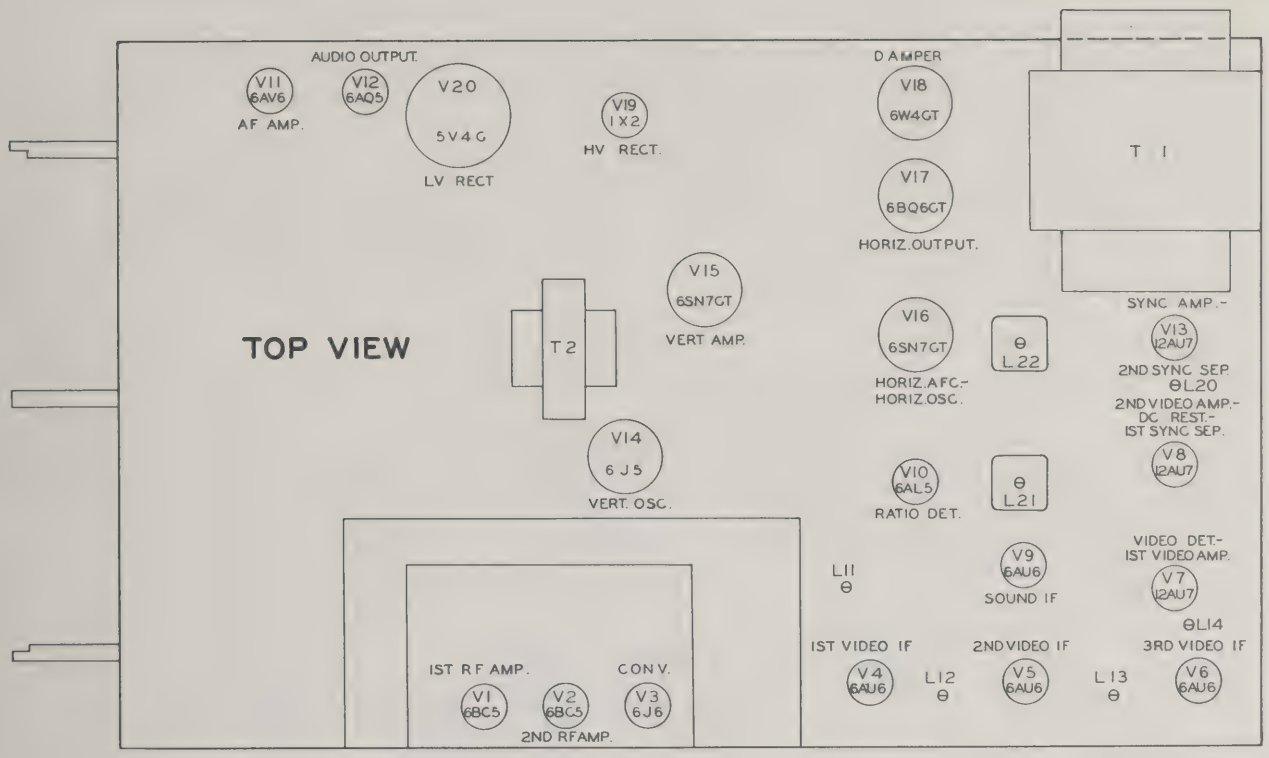
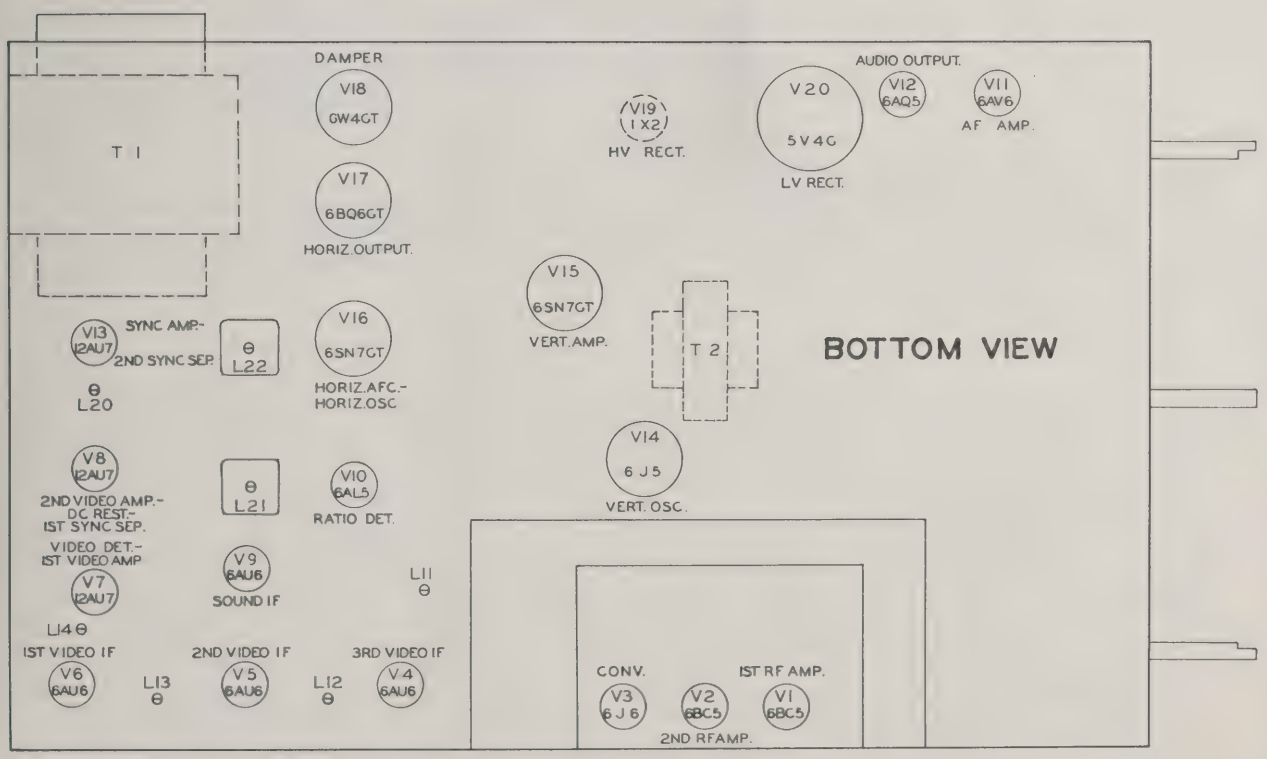



CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION




# TUBE PLACEMENT CHART

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

To prevent the high voltage shock hazard remove the horizontal output tube V17 from its socket.

## VIDEO IF ALIGNMENT

Remove the converter tube from its socket and replace with a 6J6 with pin 1 removed to prevent erroneous indications.
Alternate loading is required when aligning L11. This consists of a 1000Ω resistor shunting the primary when adjusting the secondary and shunting the secondary when adjusting the primary.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V3). Low side to chassis. | 24.5MC (Unmod.) | Any | DC Probe to Point ◇A◇. Common to chassis. | A1, A2 | With 1000Ω across secondary winding adjust A1 for maximum deflection. Remove 1000Ω and place across primary and adjust A2 for maximum deflection. Attenuate signal generator to maintain a maximum -2 volts reading. Remove 1000Ω resistor across primary. |
| 2. | Direct | " | 23.6MC (Unmod.) | " | " | A3 | Adjust for maximum deflection. |
| 3. | Direct | " | 24.6MC (Unmod.) | " | " | A4 | " |
| 4. | Direct | " | 25.6MC | " | " | A5 | " |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 24MC (10MC SWP) | 21.75MC 26.25MC | Any | Vert. Amp. to Point ◇A◇. Low side to chassis. | | Check for response curve similar to figure 1. The 21.75MC marker should be at 5% response and the 26.25MC marker should be at 50% response. If necessary SLIGHTLY retouch A1 thru A5 for proper response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 6. | Direct | High side to point A . Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe to Point ◇B◇. Common to chassis. | A6, A7 | Adjust for maximum deflection. Attenuate signal generator to maintain approximately -1 volt reading. |
| 7. | Direct | " | " | " | DC Probe to Point ◇C◇. Common to chassis. | A8 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | Direct | High side to point A . Low side to chassis. | 4.5MC (450KC Sweep) | 4.5MC | Any | Vert. Amp. to Point ◇B◇. Low side to chassis. | A6, A7 | Disconnect stabilizer capacitor C7. Adjust for maximum amplitude and symmetry as per figure 2. |
| 7. | Direct | " | " | " | " | Vert. Amp. to Point ◇C◇. Low side to chassis. | A8 | Reconnect capacitor C7. Adjust A8 to place 4.5MC at center of crossover lines as per figure 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ADJUSTMENT

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | Direct | High side to Point A . Low side to chassis. | Not used | 4.5MC (400 ∿ Mod.) | Any | Vert. Amp. to Point ◇D◇. Low side to chassis. | A9 | Adjust for MINIMUM 400 ∿ indication on scope. After alignment is complete tune in a TV test pattern and adjust A9 for maximum vertical wedge definition. |

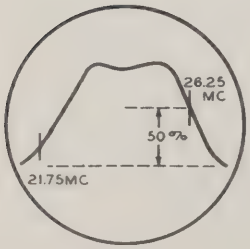


FIG. 1

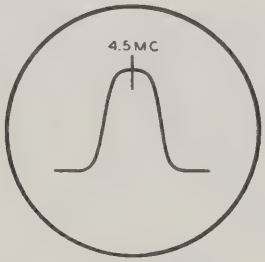


FIG. 2

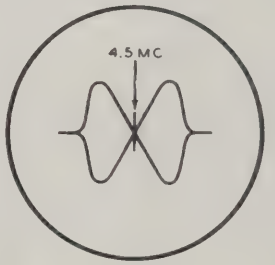


FIG. 3

## RF TUNER ALIGNMENT

Connect the negative terminal of a 3 volt battery to junction of R24 and C30 and positive terminal to chassis.
The two trimmer capacitors located near the front of the tuner are for the purpose of adjusting the antenna input circuit, these trimmers are pre-set and sealed at the factory, they should not be adjusted in the field.
Remove the dummy converter tube and replace the original 6J6 in its socket.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

## HIGH BAND OSCILLATOR ALIGNMENT

Turn the range switch of the tuner to "high band (counter-clockwise)" position.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 213MC (10MC SWP) | 212.75MC 26.25MC | Turn tuning gang fully open | Vert. Amp. to Point (E). Low side to chassis. | A10 | Adjust so the 26.25MC and 212.75MC markers coincide at 100% response as shown in figure 4. |
| 10. | " | " | 177MC (10MC SWP) | 172.75MC 26.25MC | Turn tuning gang fully closed | " | L7 | Expand or compress coil turns so the 26.25MC and 172.75MC markers coincide at 100% response as shown in figure 5. Repeat steps 9 and 10 until no further improvement can be made. |

## HIGH BAND RF ALIGNMENT

To set the tuning gang for step 11 inject a 26.25MC marker and a 211.25MC marker and turn tuning gang until both markers coincide on response curve.
To set the tuning gang for step 12 inject a 26.25MC marker and a 175.25MC marker and turn tuning gang until both markers coincide on response curve.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 213MC (10MC SWP) | 211.25MC 215.75MC | as outlined above | Vert. Amp. to Point (E). Low side to chassis. | All, A12 | Adjust A-11 for maximum amplitude at the 211.25MC point on response curve. Adjust A12 for maximum amplitude at the 215.75MC point on response curve as per figure 6. |
| 12. | " | " | 177MC (10MC SWP) | 175.25MC 179.75MC | " | " | L3, L5 | Expand or compress coil turns of L3 for maximum amplitude at the 175.25MC point on response curve. Adjust L5 for maximum amplitude at the 179.75MC point on response curve as per figure 7. |

## LOW BAND OSCILLATOR ALIGNMENT

Turn the range switch of the tuner to "low band" (clockwise) position.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 13. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 85MC (10MC SWP) | 26.25MC 84.75MC | Turn tuning gang fully open | Vert. Amp. to Point (E). Low side to chassis. | L6 | Expand or compress coil turns of L6 so the 26.25MC and 84.75MC markers coincide at 100% response as shown in figure 8. |
| 14. | " | " | 57MC (10MC SWP) | 26.25MC 54.25MC | Turn tuning gang fully closed | " | A13 | Adjust so the 26.25MC and 54.25MC markers coincide at 100% response as shown in figure 9. |

## LOW BAND RF ALIGNMENT

To set the tuning gang for step 15 inject a 26.25MC marker and a 83.25MC marker and turn tuning gang until both markers coincide on response curve.
To set the tuning gang for step 16 inject a 26.25MC marker and a 55.25MC marker and turn tuning gang with both markers coincide on response curve.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 15. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 85MC (10MC SWP) | 83.25MC 87.75MC | Set tuning gang as outlined above | Vert. Amp. to Point (E). Low side to chassis. | L2, L4 | Expand or compress coil turns of L2 for maximum amplitude at 83.75MC point on response curve. Adjust L4 for maximum amplitude at 87.75MC point on response curve as per figure 10. |
| 16. | " | " | 57MC (10MC SWP) | 55.25MC 59.75MC | " | " | L2, L4 | Expand or compress coil turns of L2 for maximum amplitude at 55.25MC point on response curve. Adjust L4 for maximum amplitude at 59.75MC point on response curve as per figure 11. Recheck step 15 to see if response has been seriously effected. If necessary a compromise adjustment of L2 and L4 will be required. |

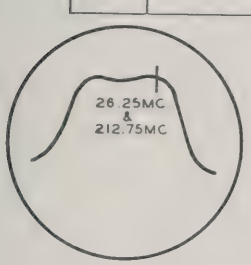


FIG.4

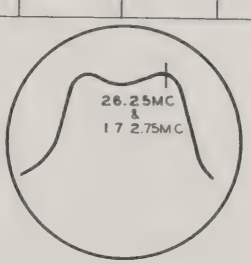


FIG.5

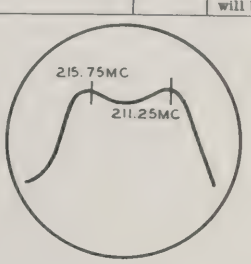


FIG.6

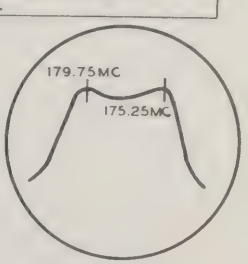


FIG.7

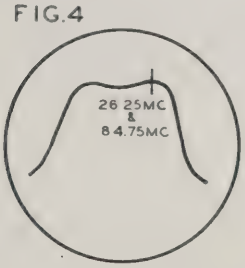


FIG.8

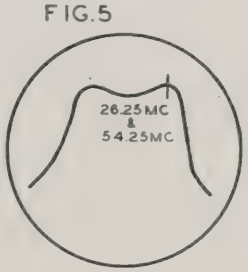


FIG.9

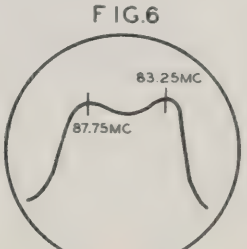


FIG.10

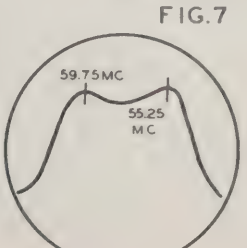


FIG.11

# VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6BC5 | -.6VDC | 0V. | 6.3VAC | 0V. | 100VDC | 100VDC | 0V. | | |
| V 2 | 6BC5 | -.4VDC | 1VDC | 6.3VAC | 0V. | 120VDC | 120VDC | 1VDC | | |
| V 3 | 6J6 | 105VDC | 85VDC | 0V. | 6.3VAC | -3VDC | §-5.4VDC | 0V. | | |
| V 4 | 6AU6 | -.6VDC | 0V. | 0V. | 6.3VAC | 130VDC | 130VDC | .3VDC | | |
| V 5 | 6AU6 | -.6VDC | 0V. | 0V. | 6.3VAC | 130VDC | 130VDC | .4VDC | | |
| V 6 | 6AU6 | 0V. | 0V. | 0V. | 6.3VAC | 220VDC | 130VDC | 1.2VDC | | |
| V 7 | 12AU7 | -.5VDC | -.5VDC | 0V. | 6.3VAC | 6.3VAC | 100VDC | -.5VDC | 0V. | 0V. |
| V 8 | 12AU7 | 300VDC | 0V. | 20VDC | 6.3VAC | 6.3VAC | 130VDC | 0V. | 10VDC | 0V. |
| V 9 | 6AU6 | -.5VDC | 0V. | 6.3VAC | 0V. | 320VDC | 28VDC | 0V. | | |
| V 10 | 6AL5 | 0V. | 0V. | 6.3VAC | 0V. | .3VDC | 0V. | -.3VDC | | |
| V 11 | 6AV6 | -.5VDC | 0V. | 0V. | 6.3VAC | 0V. | 0V. | 95VDC | | |
| V 12 | 6AQ5 | ♦-3.4VDC | ♦0V. | 0V. | 6.3VAC | ♦135VDC | ♦150VDC | ♦-3.4VDC | | |
| V 13 | 12AU7 | 260VDC | 0V. | 18VDC | 6.3VAC | 6.3VAC | 135VDC | -.1VDC | 5VDC | 0V. |
| V 14 | 6J5 | 0V. | 6.3VAC | 80VDC | -1.4VDC | -4.5VDC | 0V. | 0V. | 0V. | |
| V 15 | 6SN7GT | .1VDC | 300VDC | 10VDC 18VDC | .1VDC | 300VDC | 10VDC 18VDC | 6.3VAC | 0V. | |
| V 16 | 6SN7GT | -2.3VDC | 180VDC 105VDC | -6VDC | -50VDC | 140VDC | 0V. | 6.3VAC | 0V. | |
| V 17 | 6BQ6GT | 0V. | 6.3VAC | 420VDC | 125VDC | -15VDC | 300VDC | 0V. | 7.2VDC | TOP CAP * |
| V 18 | 6W4GT | 400VDC | 0V. | 450VDC | 0V. | 300VDC | 185VDC | ¶ | ¶ | |
| V 19 | 1X2 | * DO NOT MEASURE. | | | | | | | | |
| V 20 | 5V4G | 0V. | 330VDC | 300VDC | 325VAC | 0V. | 325VAC | 0V. | 330VDC | |
| V 21 | 16RP4 | 0V. | .4VDC | PIN 10 310VDC | PIN 11 150VDC | PIN 12 6.3VAC | | | | |

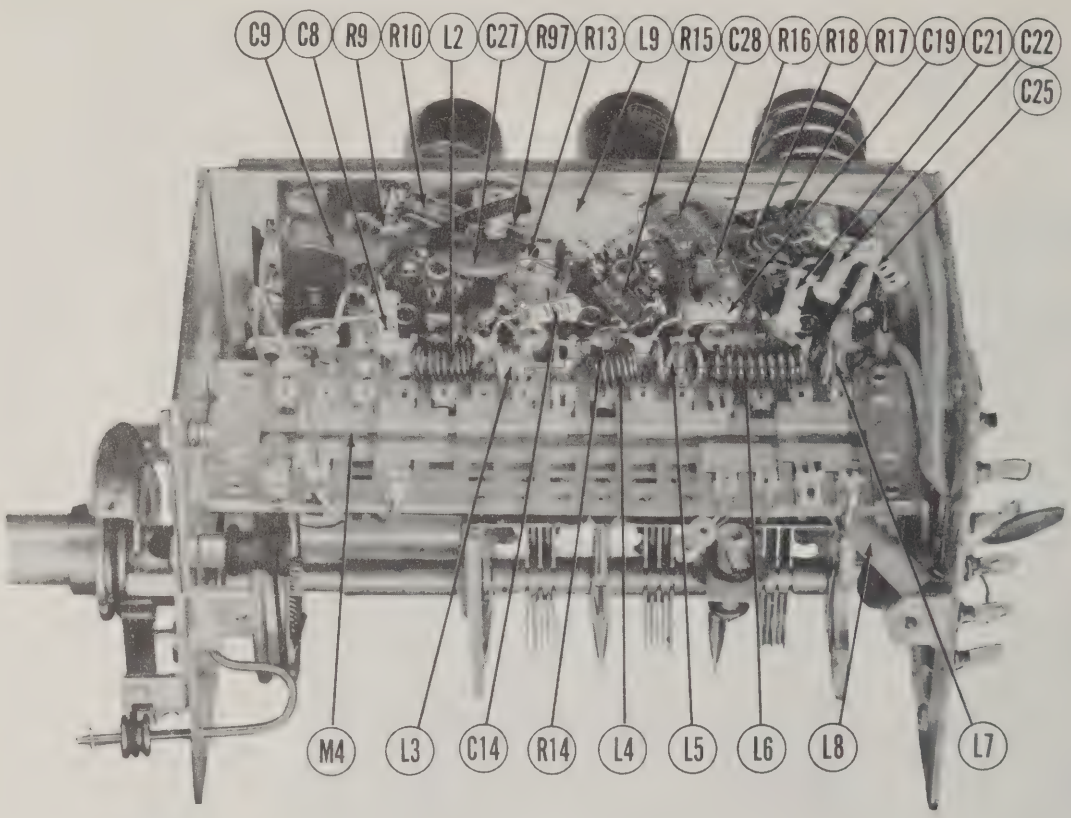
FOCUS CONTROL SET IN FULLY COUNTERCLOCKWISE POSITION.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.
¶ 6.3VAC MEASURED ACROSS FILAMENTS.
♦ MEASURED FROM JUNCTION OF C4B AND R53.

RESISTANCE READINGS

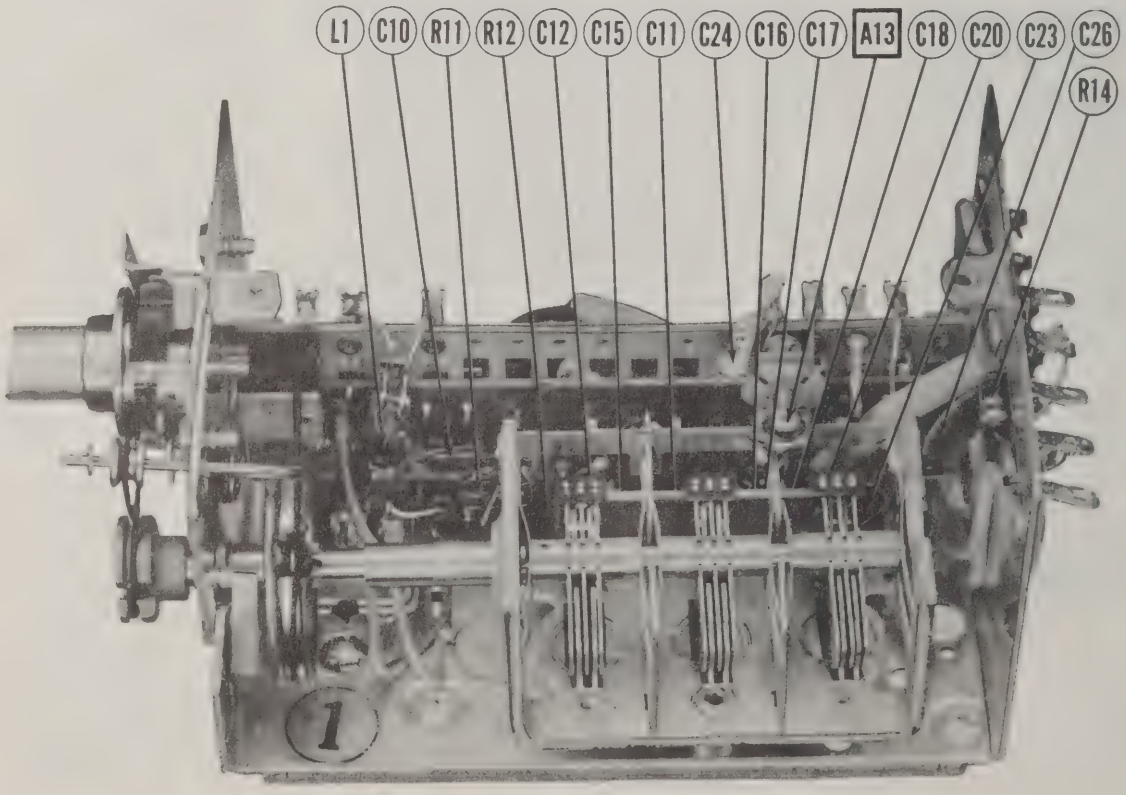
| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6BC5 | 230KΩ | 0Ω | .1Ω | 0Ω | †13KΩ | †13KΩ | 0Ω | | |
| V 2 | 6BC5 | 10KΩ | 100Ω | .1Ω | 0Ω | †12KΩ | †12KΩ | 100Ω | | |
| V 3 | 6J6 | †12KΩ | †22KΩ | 0Ω | .1Ω | 105KΩ | 10KΩ | 0Ω | | |
| V 4 | 6AU6 | 230KΩ | 0Ω | 0Ω | .1Ω | †12KΩ | †12KΩ | 47Ω | | |
| V 5 | 6AU6 | 230KΩ | 0Ω | 0Ω | .1Ω | †12KΩ | †12KΩ | 47Ω | | |
| V 6 | 6AU6 | .2Ω | 0Ω | 0Ω | .1Ω | †20KΩ | †12KΩ | 150Ω | | |
| V 7 | 12AU7 | 10KΩ | 10KΩ | .2Ω | .1Ω | .1Ω | †14KΩ | 10KΩ | 0Ω | 0Ω |
| V 8 | 12AU7 | †4.9KΩ | 1 Meg. | 10KΩ | .1Ω | .1Ω | †39KΩ | 1 Meg. | 330KΩ | 0Ω |
| V 9 | 6AU6 | 33KΩ | 0Ω | .1Ω | 0Ω | †10KΩ | †95KΩ | 0Ω | | |
| V 10 | 6AL5 | 500KΩ | 500KΩ | .1Ω | 0Ω | 10KΩ | 0Ω | 10KΩ | | |
| V 11 | 6AV6 | 4.7 Meg. | 0Ω | 0Ω | .1Ω | 0Ω | 0Ω | †470KΩ | | |
| V 12 | 6AQ5 | ♦330KΩ | ♦0Ω | 0Ω | .1Ω | †565Ω | †200Ω | ♦330KΩ | | |
| V 13 | 12AU7 | †47KΩ | 1 Meg. | 10KΩ | .1Ω | .1Ω | †12KΩ | 2.4 Meg. | 2.2KΩ | 0Ω |
| V 14 | 6J5 | 0Ω | .1Ω | #1 Meg. #3.5 Meg | 20Ω 1 Meg. | 1 Meg. 2 Meg. | Inf. | 0Ω | 0Ω | |
| V 15 | 6SN7GT | 2.2 Meg. | †1.2KΩ | 5000Ω 390Ω | 2.2 Meg. | †1.2KΩ | 5000Ω 390Ω | .1Ω | 0Ω | |
| V 16 | 6SN7GT | 850KΩ | #130KΩ #180KΩ | 260KΩ | 250KΩ | #150KΩ | 0Ω | .1Ω | 0Ω | |
| V 17 | 6BQ6GT | Inf. | .1Ω | #26Ω | †20KΩ | 470KΩ | †200Ω | 0Ω | 100Ω | TOP CAP #100Ω |
| V 18 | 6W4GT | #10KΩ | 0Ω | 280KΩ | Inf. | †200Ω | #130KΩ | Inf. | Inf. | |
| V 19 | 1X2 | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP #375Ω |
| V 20 | 5V4G | Inf. | 50KΩ | 50KΩ | 30Ω | Inf. | 30Ω | Inf. | 50KΩ | |
| V 21 | 16RP4 | 0Ω | 800KΩ | PIN 10 †200Ω | PIN 11 122KΩ | PIN 12 .1Ω | | | | |

FOCUS CONTROL SET IN FULLY COUNTERCLOCKWISE POSITION.
† MEASURED FROM PIN 8 OF V20.
# MEASURED FROM PIN 3 OF V18.
♦ MEASURED FROM JUNCTION OF C4B AND R53.

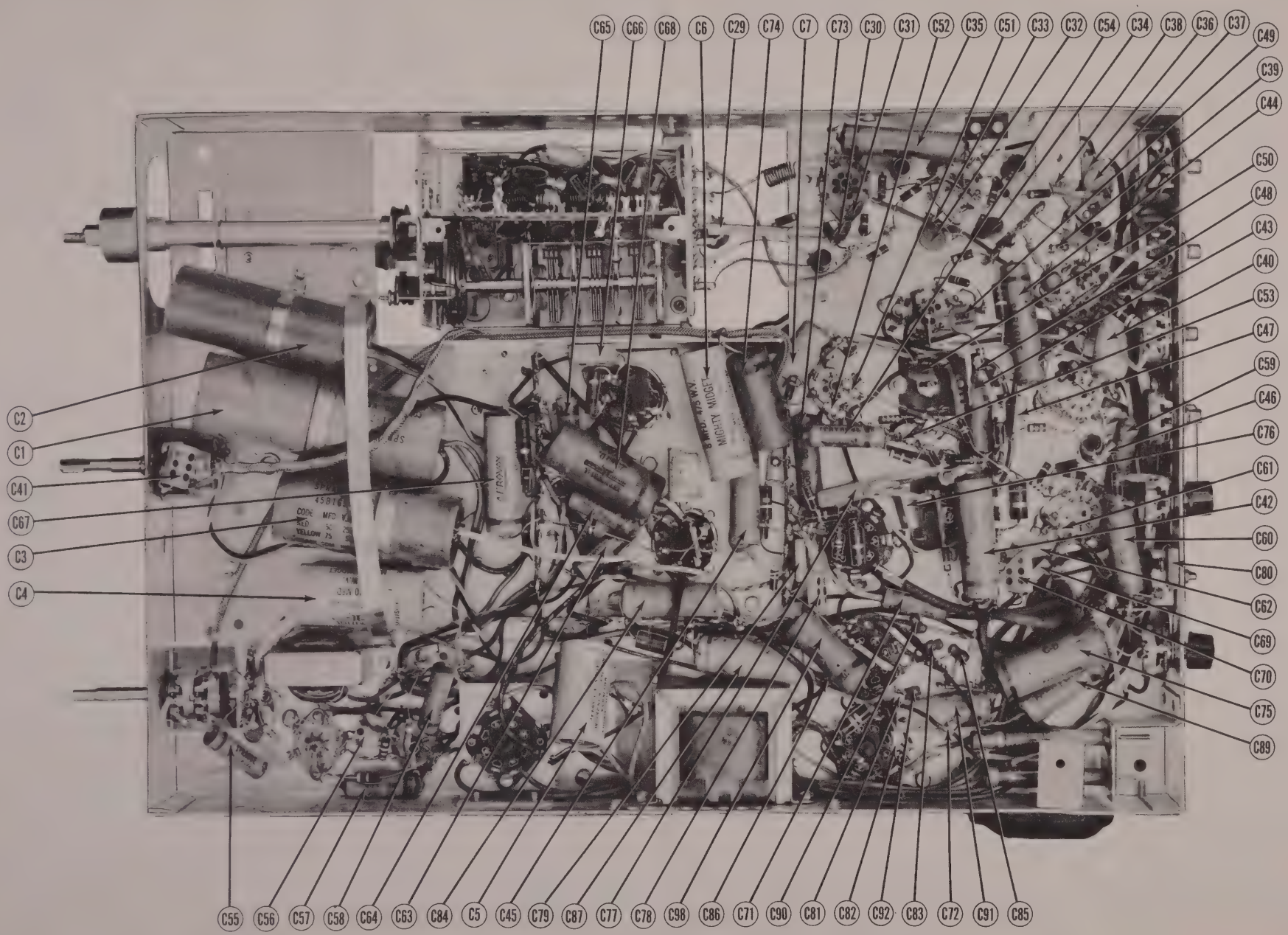
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



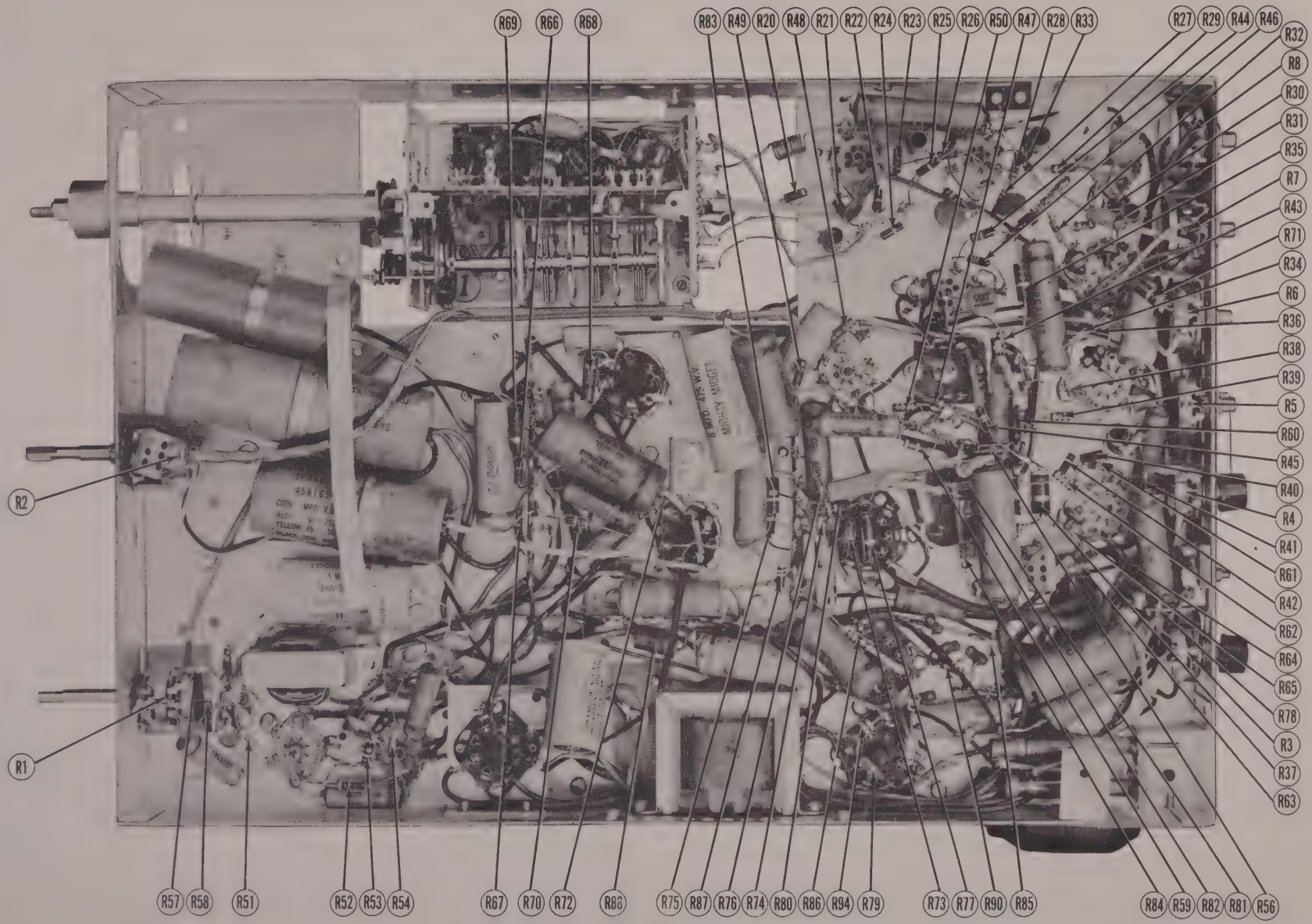

RF TUNER



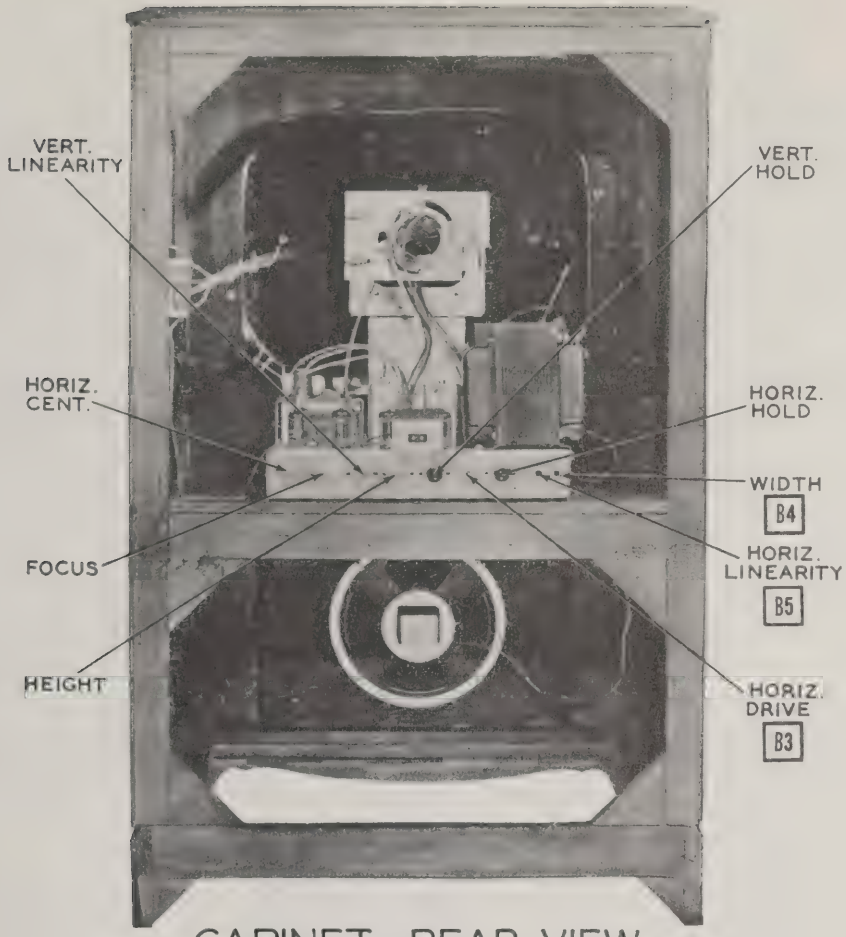

RF TUNER




CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




CABINET – REAR VIEW

# HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ADJUSTMENTS

Connect a short across terminals "C" and "D" of L22.

Turn on set and tune in a TV station preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug (B1) until picture synchronizes horizontally.

Remove the short and connect the vertical amplifier of an oscilloscope to terminal "D" of L22. Adjust the waveform adjustment slug (B2) until the broad and sharp peaks are of equal amplitude as shown in figure 12. If necessary, readjust the hold control so picture remains in sync.

HORIZONTALLY LINEARITY ADJUSTMENTS

Turn the horizontal drive trimmer (B3) clockwise as far as possible without causing fold-over in the raster.

Adjust the width slug (B4) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B5) until the picture is symmetrical from left to right. Readjustments of B3 may be necessary while making this adjustment.

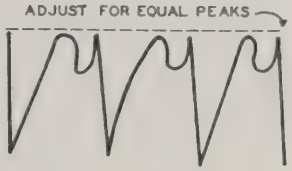



FIG.12

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No | USE | REPLACEMENT DATA: HALLICRAFTER PART No | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1A | 1st RF Amp. | 6BC5 | 6BC5 | 7BD | Used in set |
| B | 1st RF Amp. | 6AG5 | 6AG5 | 7BD | Used as replacement |
| V2A | 2nd RF Amp. | 6BC5 | 6BC5 | 7BD | Used in set |
| B | 2nd RF Amp. | 6AG5 | 6AG5 | 7BD | Used as replacement |
| V3 | Converter | 6J6 | 6J6 | 7BF | |
| V4 | 1st Video IF | 6AU6 | 6AU6 | 7BK | |
| V5 | 2nd Video IF | 6AU6 | 6AU6 | 7BK | |
| V6 | 3rd Video IF | 6AU6 | 6AU6 | 7BK | |
| V7 | Video Det. -1st Video Amp. | 12AU7 | 12AU7 | 9A | |
| V8 | 2nd Video Amp. - 1st Sync. Sep. -DC Rest. | 12AU7 | 12AU7 | 9A | |
| V9 | Sound IF Amp. | 6AU6 | 6AU6 | 7BK | |
| V10 | Ratio Det. | 6AL5 | 6AL5 | 6BT | |
| V11 | AF Amp. | 6AV6 | 6AV6 | 7BT | |
| V12 | Audio Output | 6AQ5 | 6AQ5 | 7BZ | |
| V13 | Sync. Amp. -2nd Sync. Sep. | 12AU7 | 12AU7 | 9A | |
| V14 | Vert. Osc | 6J5 | 6J5 | 6Q | |
| V15 | Vert. Amp. | 6SN7GT | 6SN7GT | 8BD | |
| V16 | Hor. AFC-Hor. Osc. | 6SN7GT | 6SN7GT | 8BD | |
| V17 | Hor. Output | 6BQ6GT | 6BQ6GT | 6AM | |
| V18 | Damper | 6W4GT | 6W4GT | 4CG | |
| V19 | Hi Rect | 1X2 | 1X2 | 7CB | |
| V20 | LV Rect | 5V4G | 5V4G | 5L | |
| V21 | Picture Tube | 16RP4 | 16RP4 | 12D | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP | RATING: VOLT | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: AEROVOX PART No. | REPLACEMENT DATA: CENTRALAB PART No. | REPLACEMENT DATA: CORNELL-DUBILIER PART No. | REPLACEMENT DATA: ERIE PART No. | REPLACEMENT DATA: SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 40 | 450 | 45A159 | PRS450/40- | | UP4445 † | | TVA-2740 | Filter |
| B | 40 | 450 | | 40 | | | | | Filter |
| C2 | 60 | 450 | 45B166 | PRS450/40 | | UP4245 † | | TVA-1613 | Filter |
| | | | | PRS450/20 | | | | | |
| | | | | PRS450/40 | | | | TVA-1511 | Decoupling-Red |
| C3A | 50 | 250 | 45B165 | PRS450/40 | | | | TVA-1310 | Vert. Amp. Cath.-Yel. |
| B | 75 | 50 | | PRS50/100 | | | | TVA-2722 | Decoupling |
| C4A | 10 | 475 | 40B546 | PRS500/10 | | BRD1145A | | | Decoupling |
| B | 10 | 475 | | PRS50/10 | | | | TVA-1130 | Hor. Cent. Cont. Byp. |
| C5 | 100 | 10 | 45B170 | PRS12/100 | | BRH21A | | TVA-1802 | Decoupling |
| C6 | 8 | 475 | 45A103 | PRS500/10 | | BR850A | | TVA-1303 | Stabilizing Cap. |
| C7 | 5 | 50 | 45A109 | PRS150/4 | | BR550 | | | RF Coupling |
| C8 | 47 | | 47X20CK500J | GP47M | D6-470 | | GPIK-47 | | AGC Filter |
| C9 | 1500 | | 47X50CJ152J | GP1500M | D6-152 | | GP2L-0015 | | RF Decoupling |
| C10 | 5000 | | 47A168 | BPD-5 | | | 811-005 | 29C1 | RF Decoupling |
| C11 | 5000 | | 47A168 | BPD-5 | | | 811-005 | 29C1 | Fixed Padder |
| C12 | 14 | | 47X20CK140J | CN14JNPO | D2-15 | | NPOK-14 | | RF Coupling † |
| C13 | 4.7 | | 47A160-5 | CN4.7DNPO | D2-4.7 | | NPOK-4.7 | | RF Coupling |
| C14 | 100 | | 47B20101K5 | GP100M | D6-101 | | GPIK-100 | | 2nd RF Cath. |
| C15 | 680 | | | GP680M | D6-681 | | GP2K-680 | | 2nd RF Decoup. |
| C16 | 5000 | | 47A168 | BPD-5 | | | 811-005 | 29C1 | 2nd RF Decoup. |
| C17 | 5000 | | 47A168 | BPD-5 | | | 811-005 | 29C1 | Fixed Padder |
| C18 | 14 | | 47X20CK140J | CN14JNPO | D2-15 | | NPOK-14 | | RF Coupling |
| C19 | 100 | | 47B20101K5 | GP100M | D6-101 | | GPIK-100 | | Osc. Coupling |
| C20 | 2.2 | | 47X20CK022J | | D2-2.2 | | | | Osc. Grid Cap. |
| C21 | 33 | | 47X20CK330J | GP33K | D6-330 | | GPIK-33 | | Fixed Trimmer |
| C22 | 17.5 | | 47X20CK180J | CN17.5JN470 | | | N470K-17.5 | | Fixed Trimmer |
| C23 | 19 | | 47X20CK190J | SI19JNPO | D2-20 | | NPOK-20 | | Fixed Trimmer |
| C24 | 10 | | | CN10FN750 | DN-10 | | N750K-10 | | Fixed Trimmer |
| C25 | 10 | | | CN10FN750 | DN-10 | | N750K-10 | | RF Bypass † |
| C26 | 5000 | | 47A168 | BPD-5 | D6-502 | | 811-005 | 29C1 | 1st RF Filament |
| C27 | 5000 | | 47A168 | BPD-5 | D6-502 | | 811-005 | 29C1 | 2nd RF Filament |
| C28 | 5000 | | 47A168 | BPD-5 | D6-502 | | 811-005 | 29C1 | Conv. Plate Dec. |
| C29 | 5000 | | 47A168 | BPD-5 | D6-502 | | 811-005 | 29C1 | AGC Filter |
| C30 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st V. IF Dec. |
| C31 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AGC Filter |
| C32 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Fixed Trimmer |
| C33 | 3.3 | | 47A160-5 | CN3.3CNPO | D2-3.3 | | NPOK-3.3 | | 2nd V. IF Dec. |
| C34 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AGC Filter |
| C35 | 25 | 200 | 46AT254J | P488-25 | | GT2P25 | | TC-2 | 3rd V. IF Screen |
| C36 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 3rd V. IF Cath. |
| C37 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 3rd V. IF Plate Dec. |
| C38 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | V. Diode Filter |
| C39 | 5 | | 47X20UJ050M | GP5K | D2-4.7 | 5W5V5 | GPIK-5 | MS-55 | Video Coupling |
| C40 | .05 | 200 | 46AU503J | P288-05 | | PTE4S5 | | TM-15 | 2nd V. Amp. Cathode |
| C41 | 56 | 500 | 47X20A560M | 1468-00005 | D6-560 | 5W5Q5 | GPIK-56 | 1FM-45 | Video Coupling |
| C42 | .1 | 600 | 46AY104J | P688-1 | | PTE6P1 | | TM-1 | Video Coupling |
| C43 | .02 | 600 | 46AT203J | P688-02 | | GT6P25 | | TM-13 | Sync. Sep. DC Rest. Cath. |
| C44 | .25 | 200 | 46AT254J | P488-25 | | GT2P25 | | TC-2 | Pic. Tube Cath. Byp. |
| | | | | | | PTE4P6 | | TM-1 | Fixed Trimmer |
| C45 | .1 | 200 | 46AU104J | P288-1 | | 5R5Q5 | NPOL-47 | MS-45 | Fixed Trimmer |
| C46 | 47 | | | CN47JNPO | D2-47 | | NPOL-47 | | Fixed Trimmer |
| C47 | 22 | 500 | 47X20A220K | | D2-22 | | NPOK-22 | | Audio Coupling |
| C48 | 100 | | 47B20101K5 | GP100K | D6-101 | 5W5T1 | GPIK-100 | 1FM-31 | S. IF Coupling |
| C49 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | S. IF Screen |
| C50 | 5000 | | 47A168 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | S. IF Plate Dec. |
| C51 | 330 | | 47B20331K5 | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | Diode Load Cap. * |
| C52 | 330 | | 47B20331K5 | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | Diode Load Cap. * |
| C53 | 1000 | | 47B20102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | De-emphasis |
| C54 | .01 | 200 | 46AU103J | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C55 | .01 | 200 | 46AU103J | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C56 | 330 | 500 | 47X20A331M | 1468-00035 | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | AF Amp. Plate |
| C57 | .01 | 600 | 46AY103J | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C58 | .01 | 600 | 46AY103J | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Output Plate |
| C59 | .01 | 200 | 46AU103J | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Sync. Coupling |
| C60 | .1 | 200 | 46AU104J | P288-1 | | PTE4P1 | | TM-1 | Sync. Amp. Cath. |

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: AEROVOX PART No. | REPLACEMENT DATA: CENTRALAB PART No. | REPLACEMENT DATA: CORNELL-DUBILIER PART No. | REPLACEMENT DATA: ERIE PART No. | REPLACEMENT DATA: SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C61 | 100 | | 47B20101K5 | GP100M | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Sync. Coupling |
| C62 | 390 | 500 | 47X20A391M | 1468-0004 | D6-391 | 5W5T4 | GP2K-390 | 1FM-34 | 2nd Sync. Sep. Cath. |
| C63 | .002 | 600 | 46AZ202J | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Integrator Net. |
| C64 | .005 | 600 | 46AU502J | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| C65 | .005 | 600 | 46AU502J | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| C66 | 4700 | 500 | 47X35A472M | 1467-005 | D6-472 | 1D5D5 | GP2M-0047 | 1FM-25 | Vert. Osc. Grid Cap. |
| C67 | .1 | 600 | 46AY104J | P688-1 | | PTE6P1 | | TM-1 | Vert. Discharge |
| C68 | .25 | 600 | 46AX254J | 684-25 | | GT6P25 | | TC-2 | Vert. Sweep Coupling |
| C69 | 180 | 500 | 47X20A181M | 1468-0002 | D6-181 | 5W5T2 | GP2K-180 | 1FM-32 | Hor. Sync. Coupling |
| C70 | 220 | 500 | 47X20A221M | 1468-0002 | D6-221 | 5W5T2 | GP2K-220 | 1FM-32 | Voltage Divider |
| C71 | .002 | 600 | 46AZ202J | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Hor. Sync. Coupling |
| C72 | 5 | | 47X20UJ050M | GP5K | D2-4.7 | 5W5V5 | GP1K-5 | MS-55 | Hor. Feedback |
| C73 | .02 | 600 | 46AU203J | P688-02 | | PTE6S2 | | TM-12 | AFC Filter |
| C74 | .25 | 200 | 46AT254J | P488-25 | | GT2P25 | | TC-2 | AFC Filter |
| C75 | .1 | 600 | 46AY104J | P688-1 | | PTE6P1 | | TM-1 | Hor. AFC Plate |
| C76 | 390 | 500 | 47X20A391M | 1468-0004 | D6-391 | 5W5T4 | GP2K-390 | 1FM-34 | Hor. Osc. Grid |
| C77 | 10000 | 300 | 47X35A103K | 1467-01 | | 1D3S1 | | 1FM-11 | Fixed Trimmer |
| C78 | 1000 | 500 | 47X20A102M | 1468-001 | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Discharge |
| C79 | 1000 | 500 | 47X20A102M | 1468-001 | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Sweep Coup. |
| C80 | 120 | 500 | 44A36J | 1468-00015 | D6-121 | 5W5T15 | GP2K-120 | 1FM-315 | Voltage Divider |
| C81 | 47 | | 47B20470K5 | GP47K | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Hor. Feedback |
| C82 | 47 | | 47B20470K5 | GP47K | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Hor. Feedback |
| C83 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Output Screen |
| C84 | .05 | 800 | 46AY503J | P688-05 | | PTE6S5 | | TM-15 | Hor. Output Screen |
| C85 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Output Screen † |
| C86 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Output Cath. |
| C87 | .25 | 300 | 46AT254J | P488-25 | | GT2P25 | | TC-2 | Hor. Output Cath. |
| C88 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Output Fil. † |
| C89 | .035 | 800 | 46AY353J | P688-033 | | | | | Damper Filter |
| C90 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Damper Filter |
| C91 | .05 | 600 | 46AY503J | P688-05 | | PTE6S5 | | TM-15 | Damper Filter |
| C92 | 1000 | | 47B20A102M5 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Fixed Trimmer |
| C93 | 500 | 20000 | 47A216 | | TV2-502 | | | | HV Filter |
| C94 | .01 | 600 | 46BR103L6 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Line Filter |
| C95 | .01 | 600 | 46BR103L6 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Line Filter |
| C96 | 1000 | 500 | 47X20A102M | 1468-001 | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Ant. Coupling |
| C97 | 6200 | | | P688-006 | D6-562 | PTE6D2 | 811-005 | TM-26 | RF Bypass † |
| C98 | .05 | 600 | | P688-05 | | PTE6S5 | | TM-15 | Fixed Trimmer † |

* When either C51 or C52 are replaced, replace both with capacitors of equal value.
† Not used in all models.
† Use mounting strap

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: Hallicrafter PART No. | REPLACEMENT DATA: IRC PART No. | REPLACEMENT DATA: CLAROSTAT PART No. | REPLACEMENT DATA: CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 50KΩ | ½ | | Concentrikit | | | Brightness control-front |
| B | 1 Meg. | ½ | 25B874 | B11-123 * B13-137 * E-202 * | RTV-72 | SBB-874 | Volume control-rear |
| C | Shaft End | | | | | | Attach per instr. in "Concentrikit". |
| R2A | 10KΩ | 2 | 25B790 | WK-10K | RTV-74 | | Contrast control |
| B | Switch | | Not Req. | 51 | | | Attach to R2A per instructions |
| R3A | 50KΩ | ½ | 25A858 | Q11-123 | AG-14-S | AN-31 | Horiz. hold control |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Attach to R3A per instructions |
| R4A | 1 Meg. | ½ | 25A857 | Q11-137 | AG-61-S | AN-69 | Vert. hold control |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Attach to R4A per instructions |
| R5A | 2.5 Meg. | ½ | 25B711 | Q11-239 | AG-84-S | AN-83 | Height control |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Attach to R5A per instructions |
| R6A | 5000Ω | ½ | 25B712 | Q11-114 | AM-19-S | AN-10 | Vert. linearity control |
| B | Shaft | | Not Req. | Not Req. | FKS-1/4 | AK-1 | Attach to R6A per instructions |
| R7 | 2500Ω | 2 | 25B710 | WK-2500 | RTV-73 | V-131 | Focus control-Wire Wound |
| R8 | 400Ω | 2 | 25B713 | W-400 | 43-400 | V-126 | Horiz. centering control-See note 1 |

* Additional parts to be used with "Concentrikit".
Note 1. Some models use a 2500Ω, 2 watt control part #25B710.

## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED |
|---|---|---|---|---|---|
| R9 | 560Ω | ½ | 33X20X561K | BTS-560 | 1st RF Grid |
| R10 | 150Ω 20% | ½ | 33X20X151M | | AGC Network |
| R11 | 1200Ω | ½ | 33X20X122K | BTS-1200 | 1st RF Coil Shunt |
| R12 | 1000Ω 20% | ½ | 33X20X102M | BTS-1000 | 1st RF Decoupling |
| R13 | 10KΩ | ½ | 33X20X103K | | 2nd RF Grid |
| R14 | 1500Ω | ½ | 33X20X152K | BTS-1500 | 2nd RF Coil Shunt |
| R15 | 220Ω 20% | ½ | 33X20X221M | | Decoupling |
| R16 | 5600Ω | ½ | 33X20X562K | BTS-5600 | Conv. Grid |
| R17 | 100KΩ 20% | ½ | 33X20X104M | | Conv. Grid |
| R18 | 10KΩ | ½ | 33X20X103K | | Osc. Grid |
| R19 | 10KΩ | ½ | 33X20X103K | | Conv. Plate Decoupling |
| R20 | 100Ω | ½ | 33X20X101K | | Decoupling |
| R21 | 5600Ω | ½ | 33X20X562K | | 1st Video IF Transformer Shunt |
| R22 | 47Ω | ½ | 33X20X470K | | 1st Video IF Cathode |
| R23 | 33KΩ | ½ | 33X20X333K | | 2nd Video IF Transformer Shunt |
| R24 | 150Ω | ½ | 33X20X151K | | AGC Network |
| R25 | 150Ω | ½ | 33X20X151K | | AGC Network |
| R26 | 100Ω | ½ | 33X20X101K | | Decoupling |
| R27 | 47Ω | ½ | 33X20X470K | | 2nd Video IF Cathode |
| R28 | 3300Ω | ½ | 33X20X332K | BTS-3300 | 3rd Video IF Transformer Shunt |
| R29 | 100Ω | ½ | 33X20X101K | | Decoupling |
| R30 | 150Ω | ½ | 33X20X151K | | 3rd Video IF Cathode |
| R31 | 18KΩ | 1 | 33X30X183K | BTA-18K | 3rd Video IF Plate Decoupling |
| R32 | 10KΩ | ½ | 33X20X103K | BTS-10K | Video Det. Diode Load |
| R33 | 220KΩ 20% | ½ | 33X20X224M | BTS-220K | AGC Network |
| R34 | 22KΩ | ½ | 33X20X223K | BTS-22K | Peaking Coil Shunt |
| R35 | 2200Ω | 1 | 33X30X222K | BTA-2200 | 1st Video Amp. Plate |
| R36 | 1 Meg. 20% | ½ | 33X20X105M | BTS-1 Meg. | 2nd Video Amp. Grid |

## RESISTORS (CONT.)

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R37 | 4700Ω | 2 | 33X40X472K | BT-2-4700 | 2nd Video IF Plate |
| R38 | 330KΩ 20% | ½ | 33X20X334M | BTS-330K | 1st Sync. Sep. Cathode |
| R39 | 4700Ω | ½ | 33X20X472K | BTS-4700 | 1st Sync. Sep. Grid |
| R40 | 1 Meg. 20% | ½ | 33X20X105M | BTS-1 Meg. | 1st Sync. Sep. Grid |
| R41 | 27KΩ | ½ | 33X20X273K | BTS-27K | 1st Sync. Sep. Plate |
| R42 | 470KΩ | ½ | 33X20X474K | BTS-470K | Picture Tube Grid |
| R43 | 33KΩ | ½ | 33X20X333K | | Sound IF Grid |
| R44 | 100KΩ | ½ | 33X20X104K | | Sound IF Screen |
| R45 | 10KΩ | ½ | 33X20X103K | | Sound IF Plate Decoupling |
| R46 | 47KΩ | ½ | 33X20X473K | BTS-47K | Voltage Divider |
| R47 | 150Ω | ½ | 33X20X151K | | Balancing |
| R48 | 10KΩ 5% | ½ | 33X20X103J | BTS-10K-5% | Ratio Det. Diode Load |
| R49 | 10KΩ 5% | ½ | 33X20X103J | BTS-10K-5% | Ratio Det. Diode Load |
| R50 | 33KΩ | ½ | 33X20X333K | BTS-33K | De-emphasis |
| R51 | 4.7 Meg. 5% | ½ | 33X20X475J | BTS-4.7 Meg. 5% | AF Amp. Grid |
| R52 | 470KΩ 20% | ½ | 33X20X474M | BTS-470K | AF Amp. Plate |
| R53 | 330KΩ 5% | ½ | 33X20X334J | BTS-330K-5% | Output Grid |
| R54 | 4.7 Meg. 5% | ½ | 33X20X475J | BTS-4.7 Meg. 5% | Voltage Divider |
| R55 | 10KΩ | 10 | 24BG103E | AB-10K | Filter-Wire Wound |
| R56 | 180KΩ | ½ | 33X20X184K | BTS-180K | Voltage Divider |
| R57 | 22KΩ | ½ | 33X20X223K | BTS-22K | Voltage Divider |
| R58 | 100KΩ | ½ | 33X20X104K | BTS-100K | Voltage Divider |
| R59 | 470KΩ 20% | ½ | 33X20X474M | BTS-470K | Phono Input Shunt |
| R60 | 1 Meg. 20% | ½ | 33X20X105M | BTS-1 Meg. | Sync. Amp. Grid |
| R61 | 10KΩ | ½ | 33X20X103K | BTS-10K | Sync. Amp. Cathode |
| R62 | 47KΩ | ½ | 33X20X473K | BTS-47K | Sync. Amp. Plate |
| R63 | 2200Ω | ½ | 33X20X222K | BTS-2200 | 2nd Sync. Sep. Cathode |
| R64 | 2.2 Meg. 20% | ½ | 33X20X225M | BTS-2.2 Meg. | 2nd Sync. Sep. Grid |
| R65 | 22KΩ | ½ | 33X20X223K | BTS-22K | Integrator |
| R66 | 8200Ω | ½ | 33X20X822K | BTS-8200 | Integrator |
| R67 | 8200Ω | ½ | 33X20X822K | BTS-8200 | Integrator |
| R68 | 1 Meg. | ½ | 33X30X105K | BTA-1 Meg. | Vert. Osc. Grid |
| R69 | 1 Meg. | ½ | 33X30X105K | BTA-1 Meg. | Vert. Osc. Plate |
| R70 | 4700Ω | ½ | 33X20X472K | BTS-4700 | Vert. Peaking |
| R71 | 390Ω | ½ | 33X30X391K | BTA-390 | Vert. Amp. Cathode |
| R72 | 2.2 Meg. 20% | ½ | 33X20X225M | BTS-2.2 Meg. | Vert. Amp. Grid |
| R73 | 820KΩ | ½ | 33X20X824K | BTS-820 | Horiz. AFC Grid |
| R74 | 150KΩ | ½ | 33X20X154K | BTS-150K | Horiz. AFC Cathode |
| R75 | 150KΩ | ½ | 33X30X154K | BTA-150K | Horiz. AFC Cathode |
| R76 | 8200Ω | ½ | 33X20X822K | BTS-8200 | Horiz. AFC Filter Network |
| R77 | 2.7 Meg. | ½ | 33X20X275K | BTA-2.7 Meg. | Voltage Divider |
| R78 | 82KΩ | ½ | 33X20X823K | BTS-82K | Voltage Divider |
| R79 | 120KΩ | ½ | 33X20X124K | BTS-120K | Voltage Divider |
| R80 | 120KΩ 5% | ½ | 33X30X124J | BTA-120K-5% | Horiz. Osc. Grid |
| R81 | 8200Ω | ½ | 33X20X822K | BTS-8200 | Horiz. Osc. Transformer Shunt |
| R82 | 22KΩ | ½ | 33X20X223K | BTS-22K | Horiz. Osc. Transformer Shunt |
| R83 | 120KΩ 5% | ½ | 33X20X124J | BTS-120K-5% | Horiz. Osc. Plate |
| R84 | 150KΩ | ½ | 33X20X154K | BTS-150K | Horiz. AFC Filter Network |
| R85 | 560KΩ 20% | ½ | 33X20X564M | BTS-560K | Feedback |
| R86 | 47Ω | ½ | 33X20X470K | | Parasitic Supp. |
| R87 | 470KΩ 20% | ½ | 33X20X474K | BTS-470K | Horiz. Output Grid |
| R88 | 100Ω | 2 | 33X40X101K | BW-2-100 | Horiz. Output Cathode |
| R89 | 33Ω | 1 | 33X30X330K | | Parasitic Supp. |
| R90 | 47Ω | ½ | 33X20X470K | | Parasitic Supp. |
| R91 | 39KΩ | 2 | 33X40X393K | BT-2-39K | Horiz. Output Screen |
| R92 | 39KΩ | 2 | 33X40X393K | BT-2-39K | Horiz. Output Screen |
| R93 | 390Ω | 1 | 33X30X391K | BTA-390 | Horiz. Centering Control Shunt-See Note 2 |
| R94 | 10KΩ | 1 | 33X30X103K | BTA-10K | Filter |
| R95 | 1 Meg. 20% | 1 | 33X30X105M | | HV Filter |
| R96 | 200Ω | 20 | 24BH201E | DG-200 | Filter-Wire Wound |
| R97 | 100Ω 20% | ½ | 33X20X101K | | 2nd RF Amp. Cathode |

Note 2. Not used in all models.

## TRANSFORMER (POWER)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: STANCOR PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: CHICAGO PART No. |
|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @ 1.7A | 600VCT .180ADC | 5VAC @ 2A | 6.3VAC @ 1.2A | 52C196 | | P-3165 | |

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING: DC RESISTANCE PRI. | RATING: DC RESISTANCE SEC. | REPLACEMENT DATA: HALLICRAFTER PART No. | REPLACEMENT DATA: STANCOR PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: CHICAGO PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| T2 | 200Ω | 1200Ω | 55B115-A | A-8111 | A-3000 | TBO-1 | Vert. Block Osc. Trans. |
| T3 | 348Ω Tap @ 48Ω | 5Ω Tap @ .2Ω, 4.1Ω SEC. 2 .0Ω | 55C144 | | HVO-6 | | Hor. Output Trans. |
| T4 | 1000Ω Tap @ 12Ω | | 55B128-0 | A-8112 | A-3037 | | Vert. Output Trans. |
| T5A | 14Ω | | 53B190 | DY-7 | MD-70F | | Hor. Deflection Coil |
| B | 62Ω | | | | | | Vert. Deflection Coil |
| T6 | 1300Ω | | 55B1159 | | | | Focus Coil |

HALLICRAFTERS
MODELS 745, 750, 751, 760, 761

# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | Hallicrafter | STANCOR | MERIT | CHICAGO | |
| | PRI. | SEC. | PRI. | SEC. | PART No. | PART No. | PART No. | PART No. | |
| T7 | 6600Ω | 4Ω | 365Ω | .5Ω | 55C134 | A-3877 | A-2930 | RO-13 | |

## SPEAKER

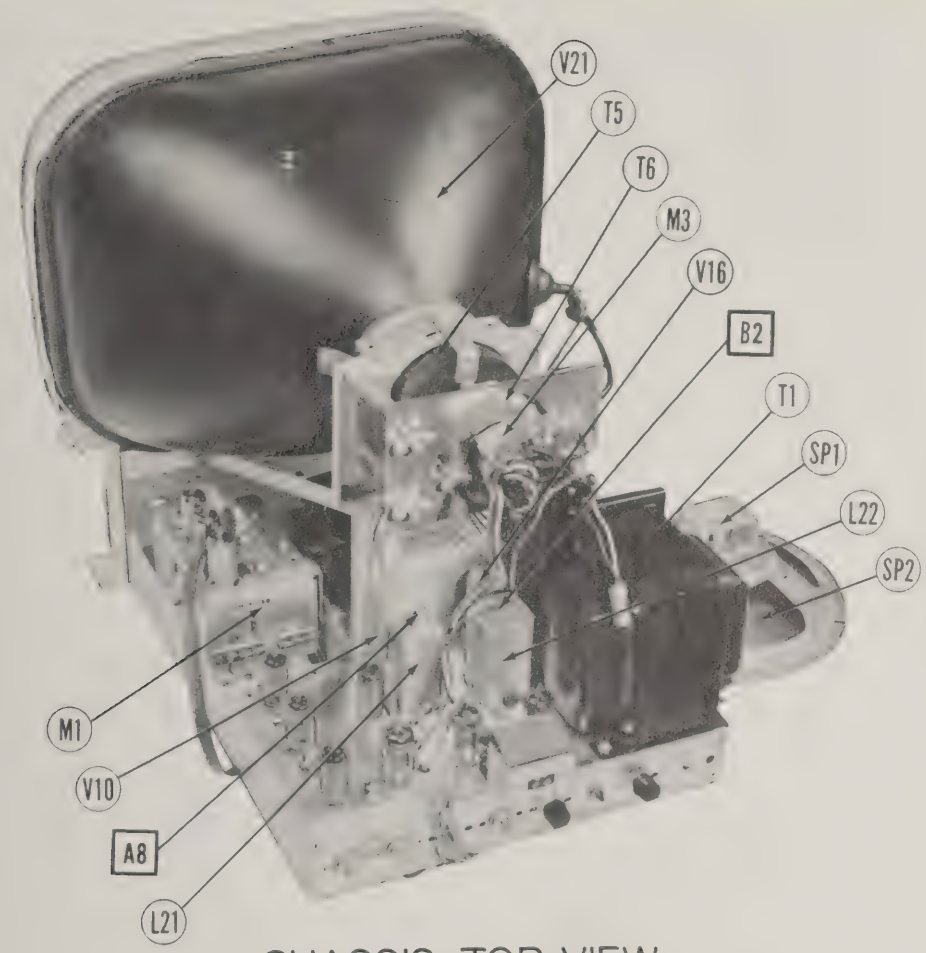
| ITEM No. | RATINGS | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|
| | | | HALLICRAFTER | JENSEN | QUAM | |
| | FIELD RES. | V. C. IMP. | PART No. | PART No. | PART No. | |
| SP1A | PM | 4Ω | 85C102 ① | ST-115 | 8A21 | ① Used in models 750, 751, 760, 761 |
| B | | | 85C101 ② | MOD. P8-V | | ② Used in model 745 |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2A | 7 3/4" | 9/16" | | | | |
| B | | | | | | |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | | | | HALLICRAFTER | MEISSNER | |
| | | PRI. | SEC. | PART No. | PART No. | |
| L1 | Ant. Coil | 0Ω | 0Ω | | | Part of tuner #1C945 |
| L2 | 1st RF | 0Ω | 0Ω | | | Low Band, part of tuner #1C945 |
| L3 | 1st RF | 0Ω | 0Ω | | | High Band, part of tuner #1C945 |
| L4 | 2nd RF | 0Ω | 0Ω | | | Low Band, part of tuner #1C945 |
| L5 | 2nd RF | 0Ω | 0Ω | | | High Band, part of tuner #1C945 |
| L6 | Osc. Coil | 0Ω | 0Ω | | | Low Band, part of tuner #1C945 |
| L7 | Osc. Coil | 0Ω | 0Ω | | | High Band, part of tuner #1C945 |
| L8 | RF Choke | 0Ω | | | | Part of tuner #1C945 |
| L9 | Fil. Choke | 0Ω | | | | Part of tuner #1C945 |
| L10 | Fil. Choke | 0Ω | | 53A191 | | |
| L11 | 1st Video IF | .2Ω | .2Ω | 50B458 | | |
| L12 | 2nd Video IF | .2Ω | .2Ω | 50A431 | | |
| L13 | 3rd Video IF | .2Ω | .2Ω | 50A431 | | |
| L14 | 4th Video IF | .2Ω | .2Ω | 50A431 | | |
| L15 | Peaking | 9.5Ω | | 51A1154 | | Wound on 1 Meg. resistor |
| L16 | Peaking | 18Ω | | 51A1155 | | Wound on 1 Meg. resistor |
| L17 | Peaking | 9.5Ω | | 51A1154 | | Wound on 1 Meg. resistor |
| L18 | Peaking | 9.5Ω | | 51A1154 | | Wound on 1 Meg. resistor |
| L19 | Peaking | 18Ω | | 51A1155 | | Wound on 1 Meg. resistor |
| L20 | Sound IF | 1.6Ω | .8Ω | 50A432 | | |
| L21 | Ratio Det. Trans. | 5Ω | 1Ω | 50B406 | | |
| L22 | Horiz. Osc. Trans. | 130Ω | 38Ω | 51B1153 | | |
| L23 | Horiz. Lin. | 26Ω | | 51B1205 | | |
| L24 | Horiz. Size | .3Ω | | 51B1072-1 | | |
| L25 | AC Line Choke | .2Ω | | 53B009 | | |
| L26 | AC Line Choke | .2Ω | | 53B009 | | |

## MISCELLANEOUS

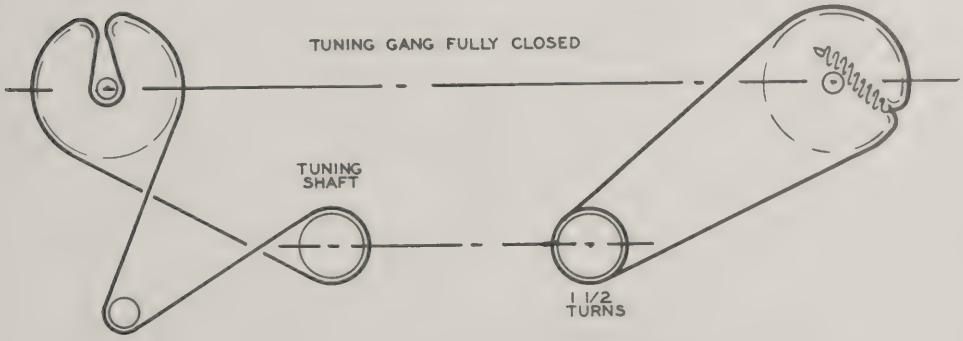
| ITEM No. | PART NAME | HALLICRAFTER PART No. | NOTES |
|---|---|---|---|
| M1 | RF Tuner | 1C945 | |
| M2 | Fuse | 39A345 | 4A 250V |
| M3 | Ion Trap | 21A101 | |
| M4 | Switch | | High Band, Low Band, part of tuner #1C945 |
| M5 | Switch | 60B381 | Phono-TV mounted on cabinet back |
| | Trimmer | 44A361 | Horiz. drive |
| | Safety Glass | 22D292 | Models 760, 761, 751, 750 |
| | Safety Glass | 22D288 | Model 745 |
| | Knob | 15B229 | Channel selector, models 760, 750, 745 |
| | Knob | 15A238 | Channel selector, models 751, 761 |
| | Knob | 15B234 | Volume, models 760, 750, 745 |
| | Knob | 15A243 | Volume, models 761, 751 |
| | Knob | 15C233 | Brightness, models 760, 750, 745 |
| | Knob | 15A242 | Brightness, models 761, 751 |
| | Knob | 15C232 | Contrast, models 760, 750, 745 |
| | Knob | 15A241 | Contrast, models 761, 751 |
| | Knob | 15C231 | Range selector, models 760, 750, 745 |
| | Knob | 15A240 | Range selector, models 761, 751 |



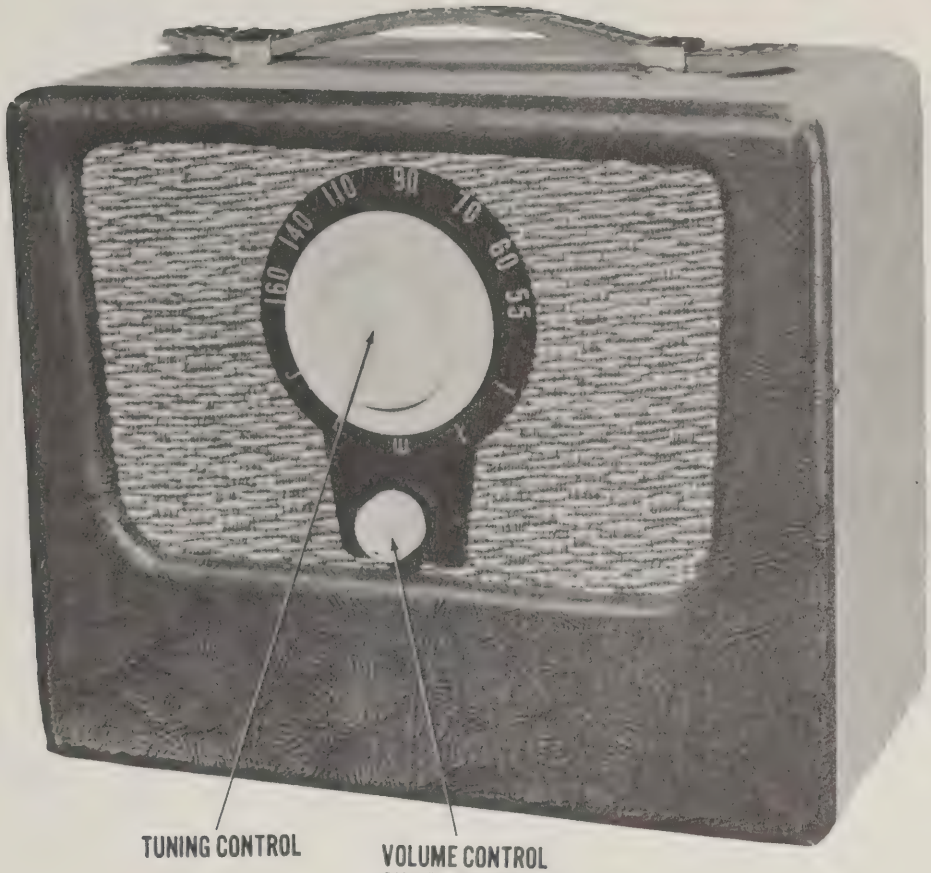

CHASSIS–TOP VIEW

## DISASSEMBLY INSTRUCTIONS

1. Remove six push-on type control knobs from front of cabinet.
2. Remove nine phillips head wood screws holding rear cover. Remove cover.
3. Remove antenna terminal strip.
4. Remove five bolts holding chassis in cabinet. Remove chassis.
5. Remove four 3/8" hex nuts holding speaker in cabinet. Remove speaker.




FINE TUNING DIAL CORD STRINGING




JEWEL MODEL 949

| | |
|---|---|
| TRADE NAME | Jewel, Model 949 |
| MANUFACTURER | Jewel Radio Corp., 10-40 5th Ave., Long Island City 1, New York |
| TYPE SET | Three Power Operated Portable Superheterodyne Receiver with Loop Antenna |
| TUBES (FOUR) | Types 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3Q4 Power Output |
| POWER SUPPLY | 110-120 Volts AC-DC or 7.5 Volts "A" Supply and 90 Volts "B" Supply |
| RATING | .14 Amp. at 117 Volts AC or 45MA at 7.5 Volts DC and 9MA at 90 Volts DC |
| TUNING RANGE—BROADCAST | 540-1650KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 6 (Grid) of 1R5 (V1). Low side to chassis. | 455KC (400 ∿ Mod.) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation. |
| 2. | .01MFD | " | 1650KC | " | " | A5 | Adjust for maximum output. |
| 3. | | Loop | 1400KC | Tune for max. output | " | A6 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |



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# PARTS LIST AND DESCRIPTIONS



## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: JEWEL PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| V1 | Converter | 1R5 | 1R5 | 7AT | |
| V2 | IF Amp. | 1U4 | 1U4 | 6AR | |
| V3 | DET.-AVC-AF | 1U5 | 1U5 | 6BW | |
| V4 | Power Output | 3Q4 | 3Q4 | 7BA | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: JEWEL PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 50 | 150 | | PRS150/50- | | EDL5315 | | TVA-2450 | Filter-Blue |
| B | 30 | 150 | | 30 | | | | | Filter-Red |
| C2 | 200 | 50 | | PRS25/250 | | BRH5025 | | TVA-1311 | Filament Bypass |
| C3 | .05 | 200 | | P288-05 | DF-503 | PTE4S5 | | TM-15-2 | AVC Filter |
| C4 | .25 | 200 | | P488-25 | | GT2P25 | | TM-2-2 | Filament Bypass |
| C5 | .05 | 200 | | P288-05 | DF-503 | PTE4S5 | | TM-15-2 | Filament Bypass |
| C6 | .01 | 200 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11-4 | IF Grid Filter |
| C7 | .05 | 200 | | P288-05 | DF-503 | PTE4S5 | | TM-15-2 | Decoupling |
| C8 | 100 | 500 | | 1468-0001 | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Diode RF Filter |
| C9 | .01 | 200 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11-4 | AF Amp. Screen |
| C10 | 100 | 500 | | 1468-0001 | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | AF Amp. Plate |
| C11 | .004 | 200 | | P688-004 | D6-402 | PTE6D4 | GP2M-004 | TM-24 | Audio Coupling |
| C12 | .004 | 200 | | P688-004 | D6-402 | PTE6D4 | GP2M-004 | TM-24 | Audio Coupling |
| C13 | .004 | 200 | | P688-004 | D 02 | PTE6D4 | GP2M-004 | TM-24 | Output Plate |
| C14 | .05 | 200 | | P288-05 | DF-503 | PTE4S5 | | TM-15-2 | Line Filter |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: JEWEL PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 1 Meg. | 1/2 | 50-17 | Q13-137 | AG-63-Z | BSK-70-S | Volume control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | Not Req. | Attach to R1A per instructions |
| C | Switch | | Not Req. | 76-2 | SWB | Not Req. | Attach to R1A per instructions |

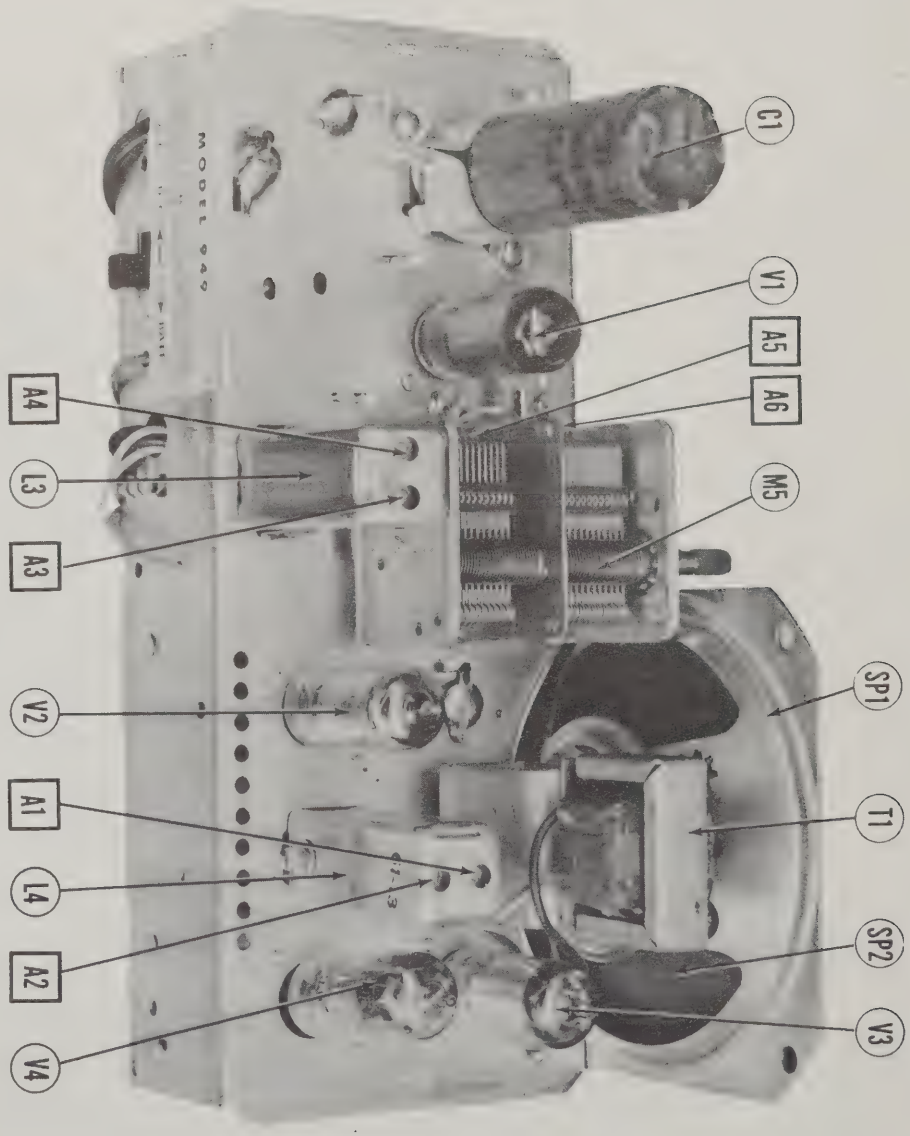
## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: JEWEL PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R2 | 2.2 Meg. | 1/2 | | BTS-2.2 Meg. | AVC Network |
| R3 | 100KΩ | 1/2 | | BTS-100K | Osc. Grid |
| R4 | 3.3 Meg. | 1/2 | | BTS-3.3 Meg. | IF Amp. Grid |
| R5 | 1000Ω | 1/2 | | BTS-1000 | Filament String |
| R6 | 8200Ω | 1/2 | | BTS-8200 | Decoupling |
| R7 | 1000Ω | 1/2 | | BTS-1000 | Filament Shunt |
| R8 | 10 Meg. | 1/2 | | BTS-10 Meg. | AF Amp. Grid |
| R9 | 4.7 Meg. | 1/2 | | BTS-4.7 Meg. | AF Amp. Screen |
| R10 | 220KΩ | 1/2 | | BTS-220K | AF Amp. Plate |
| R11 | 1 Meg. | 1/2 | | BTS-1 Meg. | Output Grid |
| R12 | 1500Ω | 1/2 | | BTS-1500 | Filament String |
| R13 | 3600Ω | 1 | | BTA-3600 | Filter |
| R14 | 2500Ω | 5 | | 1 3/4A-2500 | Filament Dropping-Wire Wound |
| R15 | 47Ω | 1 | | | Surge Limiter |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI. | RATING: IMPEDANCE SEC. | RATING: DC RES. PRI. | RATING: DC RES. SEC. | REPLACEMENT DATA: JEWEL PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 10.2KΩ | 2.9Ω | 520Ω | .7Ω | | A-3349 ① | A-2927 ① | | ① Bend mounting tabs down. |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA: JEWEL PART No. | JENSEN PART No. | QUAM PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|
| | FIELD | V. C. IMP. | | ST-113 ① | | |
| SP1 | PM | 2.9Ω | | MOD. P4-X | 4A07 ① | ① Remount output transformer. |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2 | 4" | 9/16" | | | | |

## R F COILS

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: JEWEL PART No. | REPLACEMENT DATA: MEISSNER PART No. |
|---|---|---|---|---|---|
| L1 | Loop Ant. | 2.9Ω | | | 14-1074 |
| L2 | Osc. Coil | 1.2Ω | 6.5Ω | | 16-6668 |
| L3 | 1st IF | 22Ω | 19Ω | 61-12 | 16-6669 |
| L4 | 2nd IF | 19Ω | 22Ω | 61-13 | |

## SELENIUM RECTIFIER

| ITEM No. | RATING: CURRENT | REPLACEMENT DATA: JEWEL PART No. | REPLACEMENT DATA: SYLVANIA PART No. | | NOTES |
|---|---|---|---|---|---|
| M1 | .059ADC | | NB-5 | | |

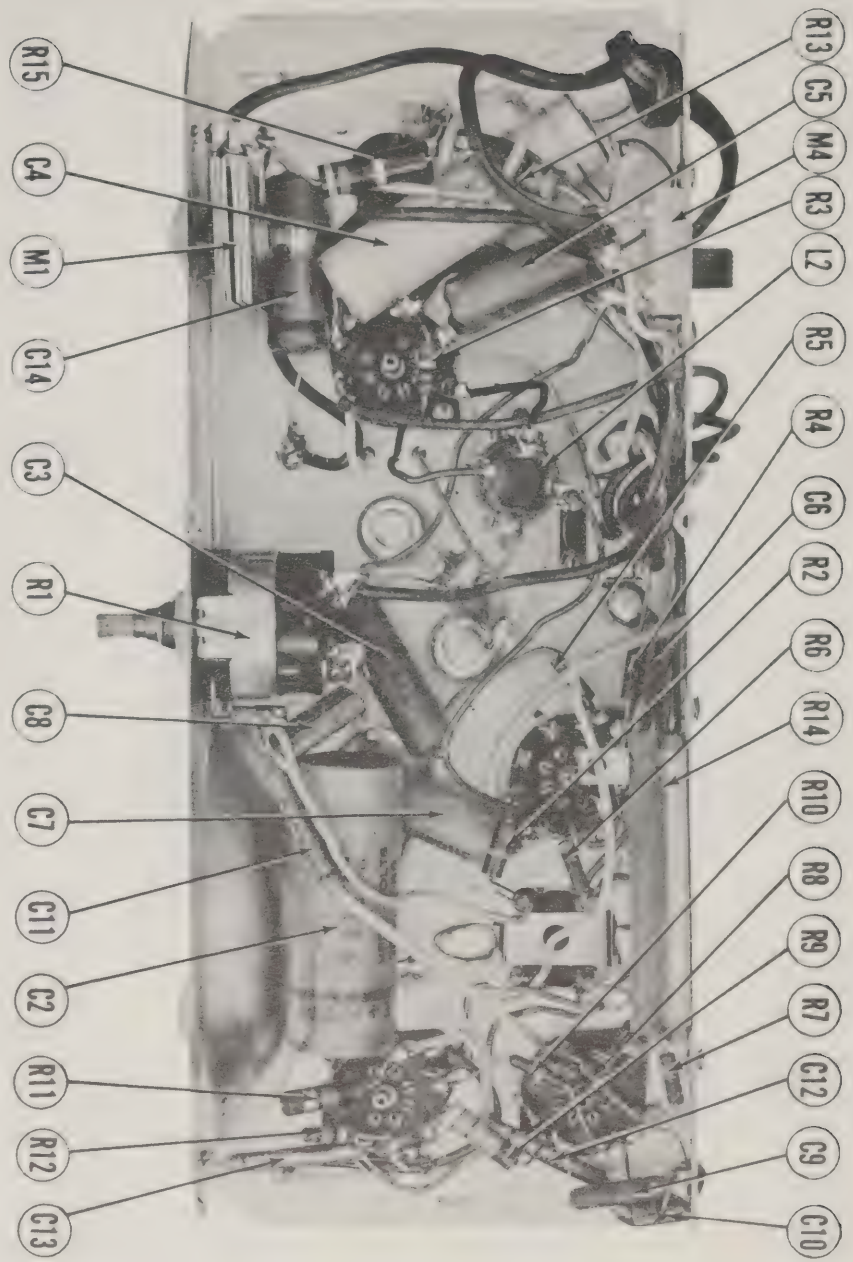
## BATTERIES

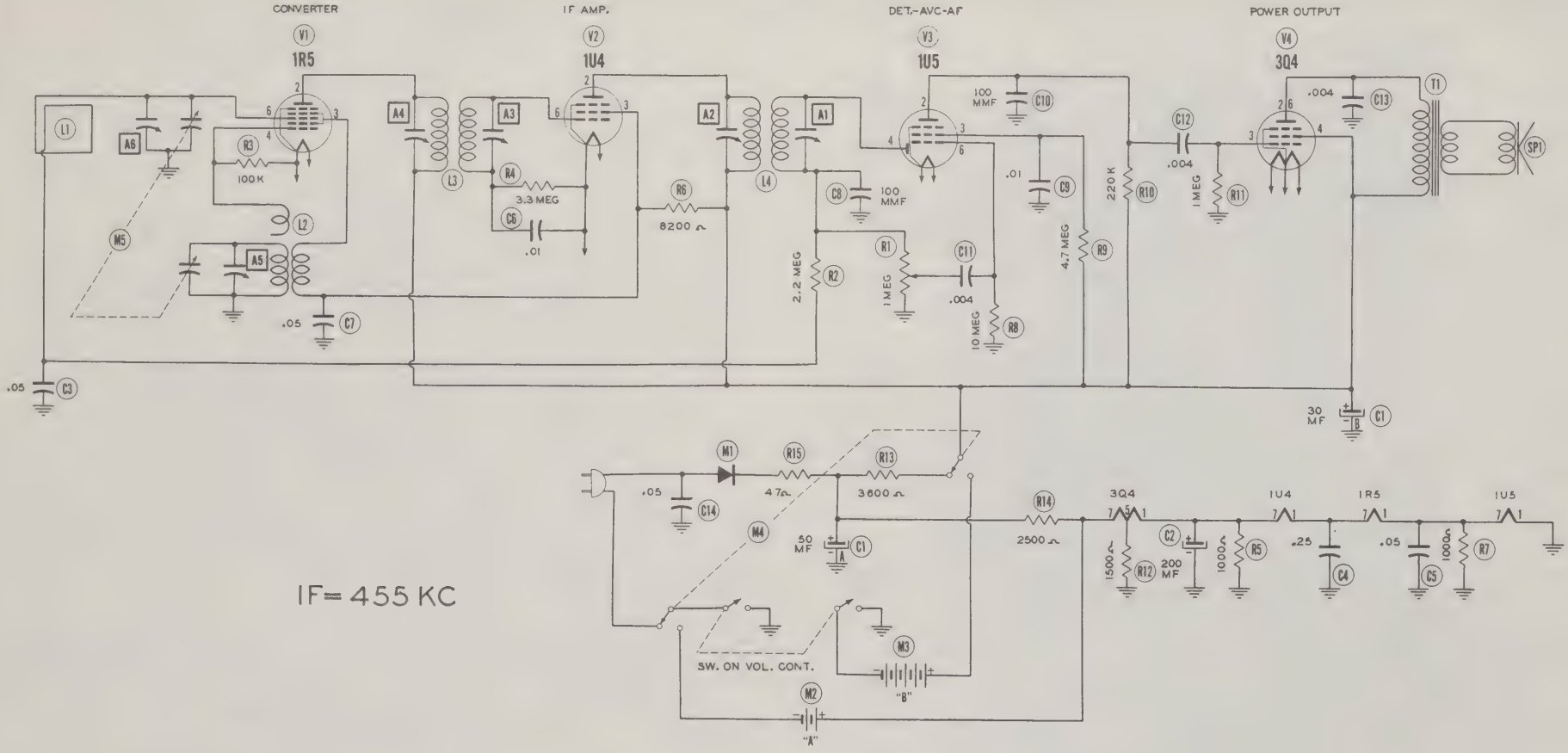
| ITEM No. | VOLTAGE | JEWEL PART No. | REPLACEMENT DATA: EVEREADY "A" | EVEREADY "B" | EVEREADY "A-B" | BURGESS "A" | BURGESS "B" | BURGESS "A-B" | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| M2 | 7.5V "A" | | 717 | | | C5 | | | |
| M3 | 90V "B" | | | 490 | | | N60 | | |

## MISCELLANEOUS

| ITEM No. | PART NAME | JEWEL PART No. | NOTES |
|---|---|---|---|
| M4 | Switch | | |
| M5 | 2 Gang Var. Cap. | 30-17 | (32-467MMF, 35-211MMF) |

## CHASSIS—BOTTOM VIEW






IF= 455 KC

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC/DC POSITION.

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 1R5 | 1.2VDC | 85VDC | 60VDC | 8-6.2VDC | 1.2VDC | -.1VDC | 2.4VDC |
| V 2 | 1U4 | 2.4VDC | 85VDC | 60VDC | 0V. | 2.4VDC | .2VDC | 3.6VDC |
| V 3 | 1U5 | 0V. | 55VDC | 13VDC | -.2VDC | 0V. | 0V. | 1.2VDC |
| V 4 | 3Q4 | 3.6VDC | 85VDC | 0V. | 85VDC | 4.8VDC | 85VDC | 6VDC |

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 1R5 | * | †3.6KΩ | †12KΩ | 100KΩ | * | 3.2 Meg. | * |
| V 2 | 1U4 | * | †3.6KΩ | †12KΩ | †3.3 Meg. | * | 3.3 Meg. | * |
| V 3 | 1U5 | * | †223KΩ | †4.7 Meg. | 1 Meg. | Inf. | 10 Meg. | * |
| V 4 | 3Q4 | * | †4.1KΩ | 1 Meg. | †3.6KΩ | * | †4.1KΩ | * |

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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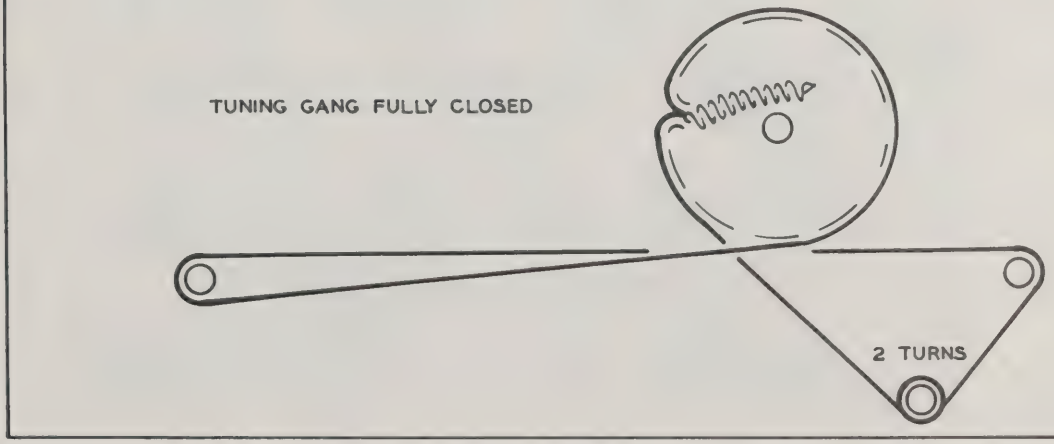
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MEISSNER MODEL 16A

| | | | |
|---|---|---|---|
| TRADE NAME | Meissner, Model 16A | | |
| MANUFACTURER | Meissner Mfg., Div. of Maguire Industries Inc., Mt. Carmel, Illinois | | |
| TYPE SET | AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver | | |
| TUBES (SEVENTEEN) | Types 6AG5 FM RF Amp., 12AT7 FM Converter, 6BA6 1st FM IF Amp., 6BA6 2nd FM IF Amp., 6AL5 Ratio Det., 6BA6 AM RF Amp., 6BE6 AM Converter, 6BA6 1st AM IF Amp., 6BA6 2nd IF Amp., 6AL5 DET-AVC, 12AY7 1st AF Amp., 6J5 Phase Inverter, 6SN7GT 2nd AF Amp., (2) 6V6GT Power Output, 6U5/6G5 Tuning Indicator, 5V4G Rectifier | | |
| POWER SUPPLY | 105-120 Volts AC | RATING | 1 Amp. at 117 Volts AC |
| TUNING RANGE-BROADCAST | 540-1600KC | FREQ. MOD. | 88-108MC |

RECORD CHANGER -- WEBSTER CHICAGO MODEL 356




DIAL CORD DRIVE

MEISSNER
MODEL 16A

MEISSNER
MODEL 16A



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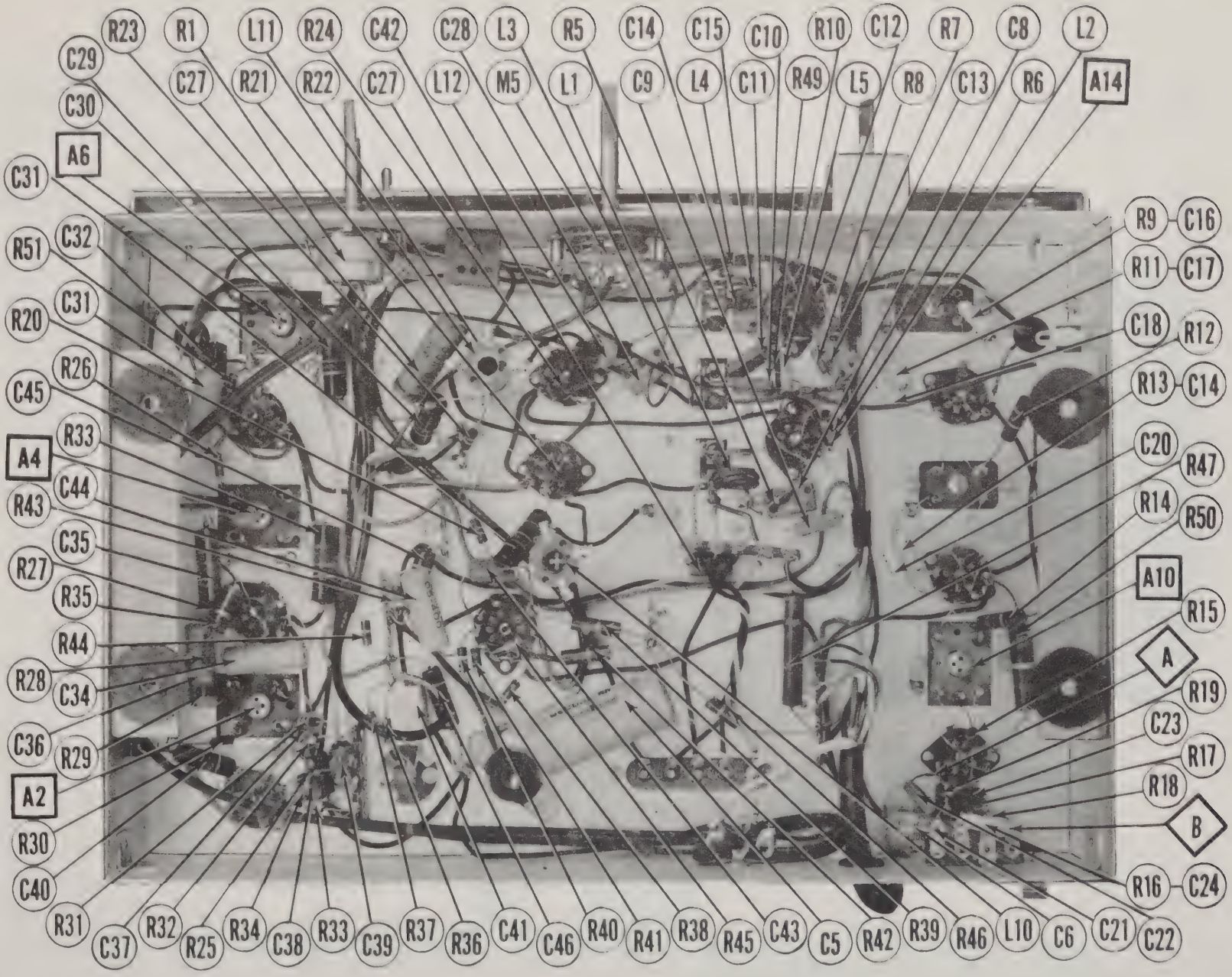
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L11
R24
C42
C28
L3
R5
C14
C15
C10
R10
C12
R7
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C29
C27
R21
R22
C27
L12
M5
L1
C9
L4
C11
R49
L5
R8
C13
R6
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C18
R12
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C23
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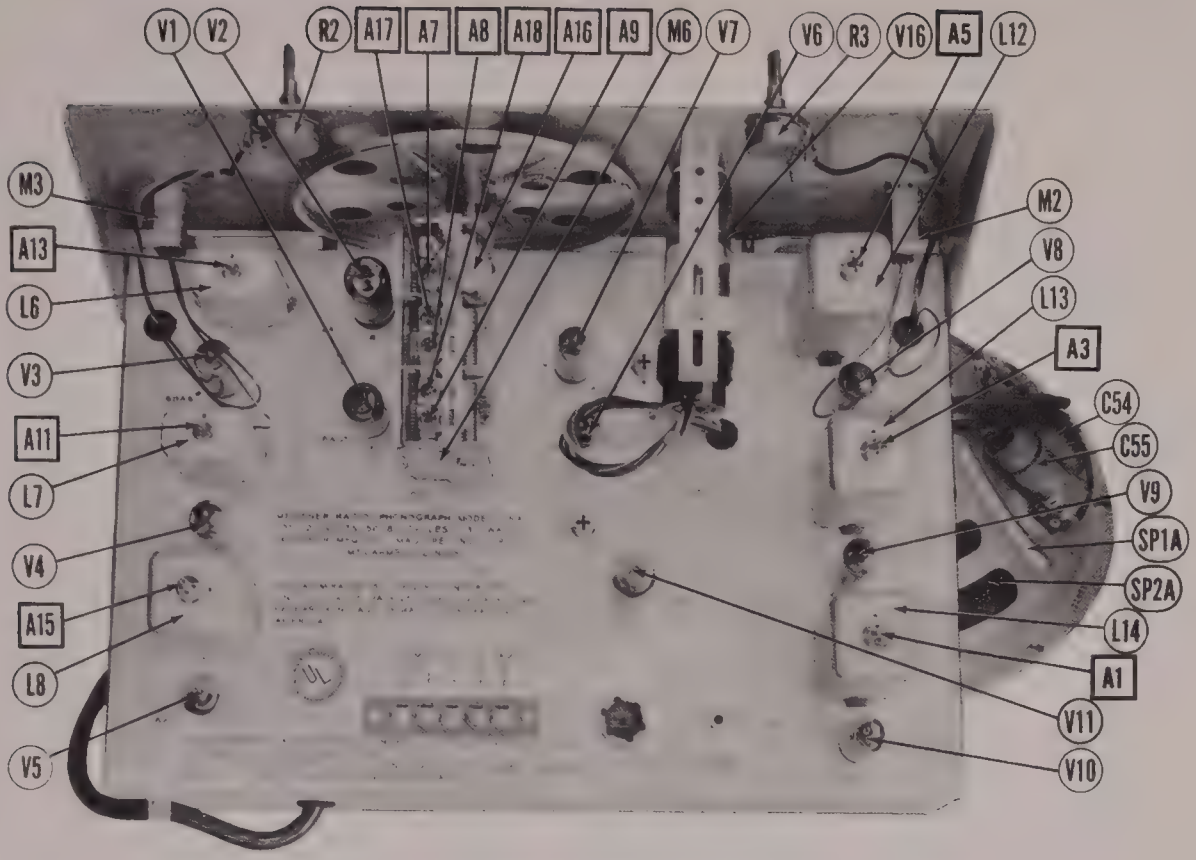
R18
B
R16
C24


V1
V2
R2
A17
A7
A8
A18
A16
A9
M6
V7
V6
R3
V16
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M3
A13
L6
V3
A11
L7
V4
A15
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SP2A
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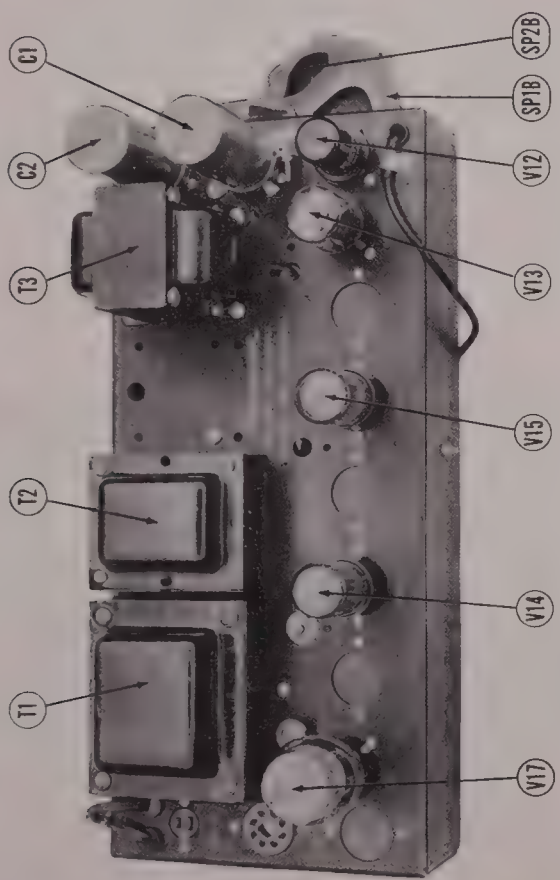
A1
V11
V10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C2
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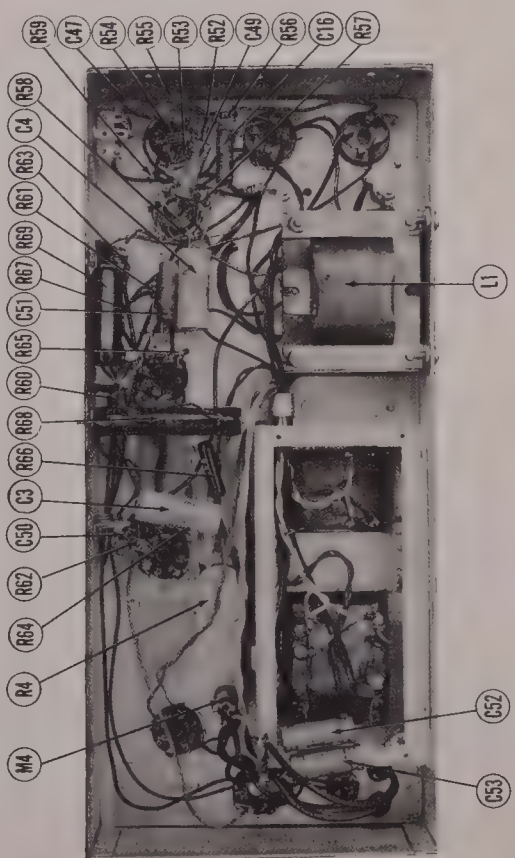
T2
T1
SP2B
SP1B
V12
V13
V15
V14
V17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C4
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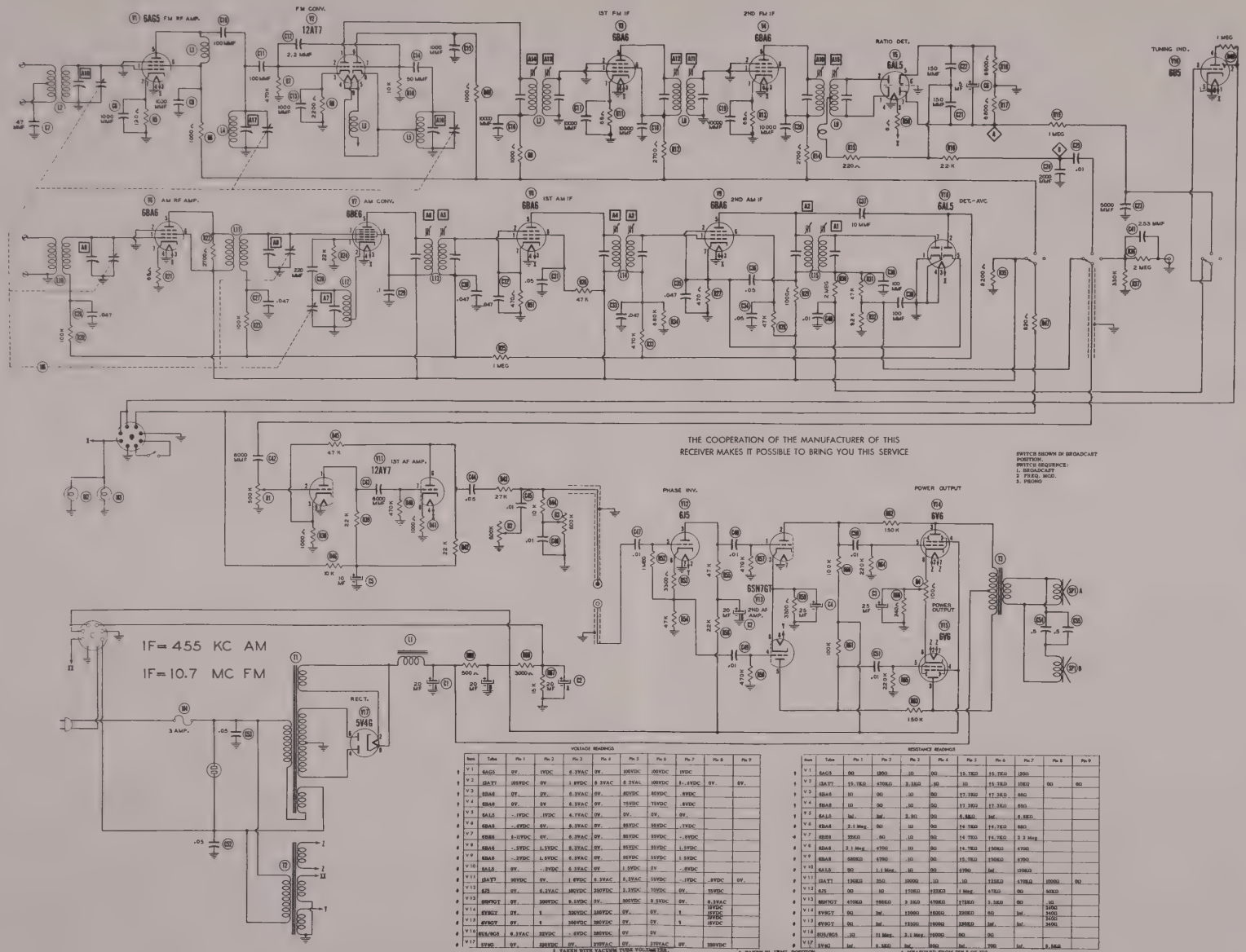
R68
R66
C3
C50
R62
R64
R4
M4
L1
C52
C53




VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| # V1 | 6AG5 | 0V. | 1VDC | 6.3VAC | 0V. | 100VDC | 100VDC | 1VDC | | |
| # V2 | 12AT7 | 105VDC | 0V. | 1.8VDC | 6.3VAC | 6.2VAC | 100VDC | 1-.4VDC | 0V. | 0V. |
| # V3 | 6BA6 | 0V. | 0V. | 6.3VAC | 0V. | 80VDC | 80VDC | .6VDC | | |
| # V4 | 6BA6 | 0V. | 0V | 6.3VAC | 0V. | 75VDC | 75VDC | .6VDC | | |
| # V5 | 6AL5 | -.1VDC | .1VDC | 6.7VAC | 0V. | 0V. | 0V. | 0V. | | |
| # V6 | 6BA6 | -.4VDC | 0V. | 6.3VAC | 0V. | 85VDC | 85VDC | .7VDC | | |
| # V7 | 6BE6 | 1-11VDC | 0V. | 6.3VAC | 0V. | 85VDC | 85VDC | -.6VDC | | |
| # V8 | 6BA6 | -.5VDC | 1.5VDC | 6.3VAC | 0V. | 95VDC | 95VDC | 1.5VDC | | |
| # V9 | 6BA6 | -.2VDC | 1.5VDC | 6.3VAC | 0V. | 95VDC | 95VDC | 1.5VDC | | |
| # V10 | 6AL5 | 0V. | -.2VDC | 6.3VAC | 0V. | 1.5VDC | 0V. | -.6VDC | | |
| # V11 | 12AT7 | 95VDC | 0V. | 1.6VDC | 6.3VAC | 6.3VAC | 0VDC | -.VDC | .8VDC | 0V. |
| # V12 | 6J5 | 0V. | 6.3VAC | 180VDC | 260VDC | 3.3VDC | 70VDC | 0V. | 75VDC | |
| # V13 | 6SN7GT | 0V. | 300VDC | 9.5VDC | 0V. | 300VDC | 9.5VDC | 0V. | 6.3VAC | |
| # V14 | 6V6GT | 0V. | 1 | 320VDC | 280VDC | 0V. | 0V. | 1 | 18VDC | |
| # V15 | 6V6GT | 0V. | 1 | 300VDC | 280VDC | 0V. | 0V. | 1 | 18VDC | |
| # V16 | 6U5/6G5 | 6.3VAC | 2EVDC | -.6VDC | 280VDC | 0V | 0V | | | |
| # V17 | 5V4G | 0V. | 320VDC | 0V. | 370VAC | 0V. | 370VAC | 0V. | 330VDC | |

# TAKEN WITH VACUUM TUBE VOLTMETER.
@ 6.3VAC MEASURED ACROSS FILAMENTS.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| # V1 | 6AG5 | 0Ω | 1200 | 1Ω | 0Ω | 15.7KΩ | 15.7KΩ | 130Ω | | |
| # V2 | 12AT7 | 15.7KΩ | 470KΩ | 2.3KΩ | 0Ω | 1Ω | 15.7KΩ | 10KΩ | 0Ω | 0Ω |
| # V3 | 6BA6 | 1Ω | 0Ω | 1Ω | 0Ω | 17.3KΩ | 17.3KΩ | 68Ω | | |
| # V4 | 6BA6 | 1Ω | 0Ω | 1Ω | 0Ω | 17.3KΩ | 17.3KΩ | 68Ω | | |
| # V5 | 6AL5 | Inf. | Inf. | 3.9Ω | 0Ω | 6.8KΩ | Inf. | 6.8KΩ | | |
| # V6 | 6BA6 | 2.1 Meg | 0Ω | 1Ω | 0Ω | 14.7KΩ | 14.7KΩ | 68Ω | | |
| # V7 | 6BE6 | 22KΩ | .6Ω | 1Ω | 0Ω | 14.7KΩ | 14.7KΩ | 3.3 Meg | | |
| # V8 | 6BA6 | 2.1 Meg | 470Ω | 1Ω | 0Ω | 14.7KΩ | 150KΩ | 470Ω | | |
| # V9 | 6BA6 | 680KΩ | 470Ω | 1Ω | 0Ω | 15.7KΩ | 150KΩ | 470Ω | | |
| # V10 | 6AL5 | 0Ω | 1.1 Meg. | 1Ω | 0Ω | 470Ω | Inf. | 150KΩ | | |
| # V11 | 12AT7 | 130KΩ | 3KΩ | 1000Ω | 1Ω | 1Ω | 135KΩ | 470KΩ | 1000Ω | 0Ω |
| # V12 | 6J5 | 0Ω | 1Ω | 170KΩ | 22KΩ | 1 Meg | 47KΩ | 0Ω | 50KΩ | |
| # V13 | 6SN7GT | 470KΩ | 198KΩ | 3.3KΩ | 470KΩ | 172KΩ | 3.3KΩ | 0Ω | 1Ω | |
| # V14 | 6V6GT | 0Ω | Inf. | 120Ω | 150Ω | 220KΩ | 0Ω | Inf. | 340Ω | |
| # V15 | 6V6GT | 0Ω | Inf. | 120Ω | 150Ω | 135KΩ | Inf. | Inf. | 340Ω | |
| # V16 | 6U5/6G5 | 1Ω | 71 Meg. | 3.1 Meg. | 1500Ω | 0Ω | 0Ω | | | |
| # V17 | 5V4G | Inf. | 5.4KΩ | Inf. | 95Ω | Inf. | 70Ω | Inf. | 5.4KΩ | |

‡ TAKEN IN "FM" POSITION
‡ TAKEN IN "AM" POSITION
† MEASURED FROM PIN 5 OF V17

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning gang fully closed and set pointer to last reference mark on low frequency end of dial backplate.

### AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Remove the speaker plug from its socket and connect an 8Ω, 10 watt resistor across the socket terminals.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (Grid) of 6BE6 (V7). Low side to chassis. | 455KC (400 ∿ Mod.) | AM (CCW) | Tuning gang fully open | Across 8Ω res. (see instructions above) | A1, A2, A3, A4, A5, A6 | Adjust for maximum output. |
| 2. | 200MMF | High side to AM antenna terminal. Low side to chassis. | 1400KC | " | Tune for max. output | " | A7, A8, A9 | " |

### FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 3. | .01MFD | High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis. | 10.7MC (Unmod.) | FM (2nd position clockwise) | Tuning gang fully open | DC Probe to Point (A). Common to chassis. | A10, A11, A12 | Adjust for maximum deflection. Attenuate signal generator to maintain a maximum -1 volt reading. |
| 4. | .01MFD | High side to pin 2 (Grid) of 12AT7 (V2). Low side to chassis. | " | " | " | " | A13, A14 | Adjust for maximum output |
| 5. | .01MFD | " | " | " | " | DC Probe to Point (B). Low side to chassis. | A15 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

### FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 3. | .01MFD | High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis. | 10.7MC (450KC Sweep) | FM (2nd position clockwise) | Tuning gang fully open | Vert. Amp. to Point (A). Low side to chassis. | A10, A11, A12 | Disconnect stabilizier capacitor C6. Adjust for maximum amplitude and symmetry as per figure 1. |
| 4. | .01MFD | High side to pin 2 (Grid) of 12AT7 (V2). Low side to chassis. | " | " | " | " | A13, A14 | Adjust for maximum amplitude and symmetry as per figure 1. |
| 5. | .01MFD | " | " | " | " | Vert. Amp. to Point (B). Low side to chassis. | A15 | Reconnect capacitor C6. Adjust A15 to place 10.7MC at center of crossover lines as per figure 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. |

### FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | .01MFD | High side to pin 2 (Grid) of 12AT7 (V2). Low side to chassis. | 108MC (Unmod.) | FM (2nd position clockwise) | 108MC | DC Probe to Point (B). Common to chassis. | A16 | Start at maximum trimmer capacity and adjust for maximum deflection at first response reached. |
| 7. | .01MFD | " | 88MC | " | 88MC | " | L4 | Expand or compress coil turns for maximum deflection. Repeat steps 6 and 7 until no further improvement can be made. |
| 8. | .01MFD | High side to pin 1 (Grid) of 6AG5 (V1). Low side to chassis. | 108MC | " | 108MC | " | A17 | Adjust for maximum deflection while rocking tuning gang. |
| 9. | .01MFD | " | 88MC | " | 88MC | " | L3 | Expand or compress coil turns for maximum deflection while rocking tuning gang. Repeat steps 8 and 9 until no further improvement can be made. If necessary, reset trimmer A16. |
| 10. | Two 150Ω carbon res. | Across "FM" antenna terminals with 150Ω in each lead. | 108MC | " | 108MC | " | A18 | Adjust for maximum deflection. |
| 11. | " | " | 88MC | " | 88MC | " | L1 | Expand or compress coil turns of secondary for maximum deflection. Repeat steps 10 and 11 until no further improvement can be made. |

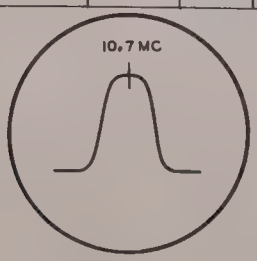



FIG. 1

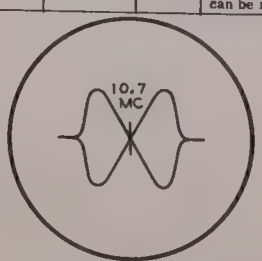



FIG. 2

# PARTS LIST AND DESCRIPTIONS (Continued)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA MEISSNER PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C44 | .05 | 400 | 34123 | P488-05 | | PTE4S5 | | TM-15 | Audio Coupling |
| C45 | .01 | 400 | 34122 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Tone Compensation |
| C46 | .01 | 400 | 34122 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Tone Compensation |
| C47 | .01 | 600 | 28101 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C48 | .01 | 600 | 28101 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C49 | .01 | 600 | 28101 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C50 | .01 | 600 | 28101 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C51 | .01 | 600 | 28101 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Audio Coupling |
| C52 | .05 | 600 | 28172 | P688-05 | | PTE6S5 | | TM-15 | Line Filter |
| C53 | .05 | 600 | 28172 | P688-05 | | PTE6S5 | | TM-15 | Line Filter |
| C54 | .5 | 400 | | 484-5 | | GT4P5 | | TC-5 | Audio Coupling |
| C55 | .5 | 400 | | 484-5 | | GT4P5 | | TC-5 | Audio Coupling |

* Items C16 and R9 are combined into one unit obtainable under MFGR'S Part No. 34151-1
† Items C17 and R11 are combined into one unit obtainable under MFGR'S Part No. 34150-1
‡ Items C19 and R13 are combined into one unit obtainable under MFGR'S Part No. 34150-1
§ Items C24 and R16 are combined into one unit obtainable under MFGR'S Part No. 34151-4
Note 1. When either items C21 or C22 are replaced, replace both with capacitors of equal value.
Note 2. Not used in all models.
Note 3. Use twist prong mounting.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA MEISSNER PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 500KΩ | ½ | 29232 | Q13-133 | AM-60-Z | B-60-S | Volume control and switch |
| B | Shaft | | Not Req. | Not Req. | FS-3 | Not Req. | Attach to R1A per instructions |
| C | Switch | | Not Req. | 76-1 | SW-A | Not Req. | Attach to R1A per instructions |
| R2A | 500KΩ | ½ | 29539 | Q13-133 | AG-60-Z | B-60 | Treble tone control |
| B | Shaft | | Not Req. | Not Req. | FS-3 | Not Req. | Attach to R2A per instructions |
| R3A | 500KΩ | ½ | 29539 | Q13-133 | AG-60-Z | B-60 | Bass tone control |
| B | Shaft | | Not Req. | Not Req. | FS-3 | Not. Req. | Attach to R3A per instructions |
| R4 | 100Ω | 3 | 29260 | | 58-100 | V-121 | Cathode balance control-wire wound |

## RESISTORS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA MEISSNER PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R5 | 120Ω | ½ | RC20AE121K | | FM RF Amp. Cathode |
| R6 | 1000Ω | ½ | RC20AE102K | BTS-1000 | FM RF Amp. Decoupling |
| R7 | 470KΩ | ½ | RC20AE474K | BTS-470K | FM Conv. Grid |
| R8 | 2200Ω | ½ | RC20AE222K | BTS-2200 | FM Conv. Cathode |
| R9 | 1000Ω | ½ | * | BTS-1000 | FM Conv. Decoupling |
| R10 | 10KΩ | ½ | RC20AE103M | BTS-10K | FM Osc. Grid |
| R11 | 68Ω | ½ | † | | 1st FM IF Amp. Cathode |
| R12 | 2700Ω | 1 | RC30AE272K | BTA-2700 | 1st FM IF Amp. Decoupling |
| R13 | 68Ω | ½ | ‡ | | 2nd FM IF Amp. Cathode |
| R14 | 2700Ω | 1 | RC30AE272K | BTA-2700 | 2nd FM IF Amp. Decoupling |
| R15 | 220Ω | ½ | RC20AE221M | | Balancing |
| R16 | 22KΩ | ½ | § | BTS-22K | De-emphasis |
| R17 | 6800Ω | ½ | RC20AE682K | BTS-6800 | Ratio Det. Diode Load |
| R18 | 6800Ω | ½ | RC20AE682K | BTS-6800 | Ratio Det. Diode Load |
| R19 | 1 Meg. | ½ | RC20AE105M | BTS-1 Meg. | Tuning Eye Grid Filter |
| R20 | 100KΩ | ½ | RC20AE104K | BTS-100K | AVC Network |
| R21 | 68Ω | ½ | RC20AE680K | BW-½-68 | AM RF Amp. Cathode |
| R22 | 2700Ω | ½ | RC20AE272K | BTS-2700 | AM RF Coil Shunt |
| R23 | 100KΩ | ½ | RC20AE104K | BTS-100K | AVC Network |
| R24 | 22KΩ | ½ | RC20AE223M | BTS-22K | AM Osc. Grid |
| R25 | 1 Meg. | ½ | RC20AE105M | BTS-1 Meg. | AVC Network |
| R26 | 47KΩ | ½ | RC20AE473M | BTS-47K | 1st AM IF Amp. Screen Dropping |
| R27 | 470Ω | ½ | RC20AE471K | BTS-470 | 2nd AM IF Amp. Cathode |
| R28 | 47KΩ | ½ | RC20AE473J | BTS-47K | 2nd AM IF Amp. Screen Dropping |
| R29 | 1000Ω | ½ | RC20AE102K | BTS-1000 | 2nd AM IF Amp. Plate Decoupling |
| R30 | 2 Meg. | ½ | RC20AE205M | BTS-2.2 Meg. | Tuning Eye Grid Filter |
| R31 | 47KΩ | ½ | RC20AE473J | BTS-47K | Diode RF Filter |
| R32 | 82KΩ | ½ | RC20AE823K | BTS-82K | Diode Load |
| R33 | 470KΩ | ½ | RC20AE474K | BTS-470K | AVC Network |
| R34 | 680KΩ | ½ | RC20AE684M | BTS-680K | AVC Network |
| R35 | 8200Ω | 2 | RC40AE822K | BT-2-8200 | Bleeder |
| R36 | 2 Meg. | ½ | RC20AE205M | BTS-2.2 Meg. | Phono Tone Compensation |
| R37 | 330KΩ | ½ | RC20AE334M | BTS-330K | Phono Tone Compensation |

# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | RATINGS FIELD RES. | RATINGS V. C. IMP. | REPLACEMENT DATA MEISSNER PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1A | PM | 13Ω | 29542 | | 12A6Z13 | |
| B | PM | 47Ω | 29541 | | | |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2A | 11 3/8" | 1" | | | | |
| B | 5 3/4" | 3/4" | | | | |

## FILTER CHOKE

| ITEM No. | RATINGS TOTAL DIRECT CURRENT | RATINGS D. C. RESISTANCE | RATINGS INDUCTANCE (0 CURRENT 1000 ∽) | REPLACEMENT DATA MEISSNER PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | .120ADC | 75Ω | 6 Henries | 29224 | C-1410 ③ | C-2991 ③ | | ③ Drill new mounting hole. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA MEISSNER PART No. | MEISSNER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L2 | FM Ant. | 0Ω | 0Ω | * | | * Secondary part #05757, primary part #05763 |
| L3 | FM RF Choke | 1.2Ω | | 06073 | | |
| L4 | FM RF | 0Ω | | 06071 | | |
| L5 | FM Osc. | 0Ω | | 06072 | | |
| L6 | Fil. Choke | .1Ω | | 05760 | | |
| L7 | 1st FM IF | 1Ω | 1Ω | 05452 | 16-3487 | |
| L8 | 2nd FM IF | 1Ω | 1Ω | 05452 | 16-3487 | |
| L9 | Ratio Det. Trans. | 1Ω | .2Ω | 05453 | 17-3487 | |
| L10 | AM Ant. | 40Ω | 4.5Ω | 05754 | | |
| L11 | AM RF | 40Ω | 4.5Ω | 05755 | | |
| L12 | AM Osc. | 5.2Ω | | 05756 | 14-1073 | Tap at .6Ω |
| L13 | 1st AM IF | 6.2Ω | | 06070 | | |
| L14 | 2nd AM IF | 6.2Ω | | 06070 | | |
| L15 | 3rd AM IF | 6Ω | 6.7Ω | 04238 | | |

## PHONO CARTRIDGE and NEEDLE

| ITEM No. | REPLACEMENT DATA MEISSNER PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | SHURE PART No. CARTRIDGE | SHURE PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|
| M1 | | LQD-1J | Q | 920W * | A62A<br>A65MG | * Complete tone arm |

ASTATIC AND SHURE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED.

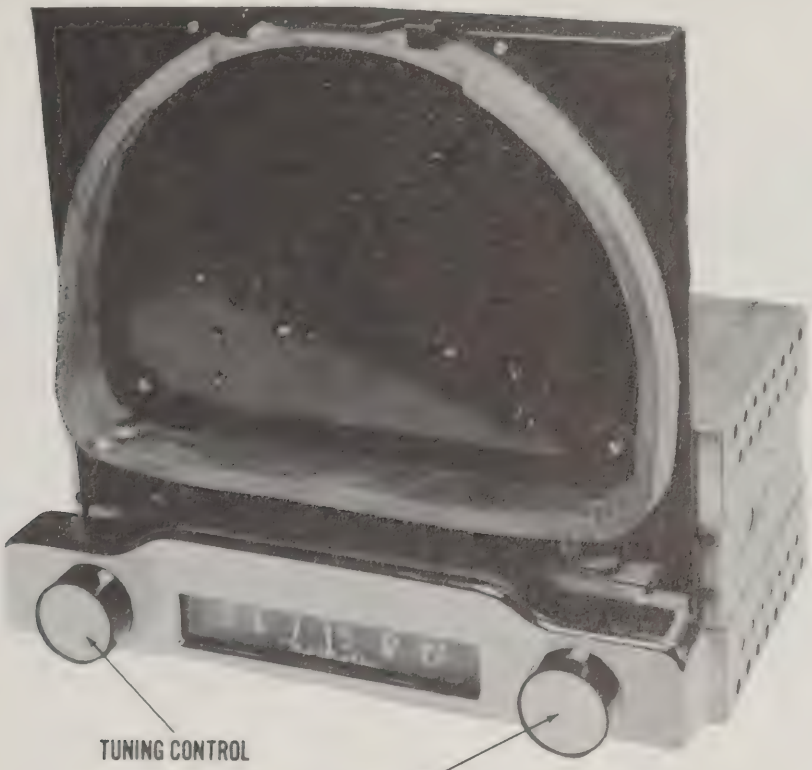
## DIAL LIGHTS

| ITEM No. | BASE TYPE | VOLTS | AMPS. | BEAD COLOR | REPLACEMENT DATA MEISSNER PART No. | | NOTES |
|---|---|---|---|---|---|---|---|
| M2 | Bayonet | 6-8 | .25 | Blue | 29262 | | Type #44 |
| M3 | Bayonet | 6-8 | .25 | Blue | 29262 | | Type #44 |

## MISCELLANEOUS

| ITEM No. | PART NAME | MEISSNER PART No. | NOTES |
|---|---|---|---|
| M4 | Fuse | 29276 | 3 Amp. 250 Volt, 3AG |
| M5 | Switch | 29538 | Function |
| M6 | 3 Gang Var. Cap. | 34118 | (52-556MMF, 53-545MMF, 42-229MMF) |
| | Dial Pointer | 29425 | |

MOTOROLA
MODEL SROB (Ch. OB)




MOTOROLA
MODEL SROB (Ch. OB)

MOTOROLA MODEL SROB

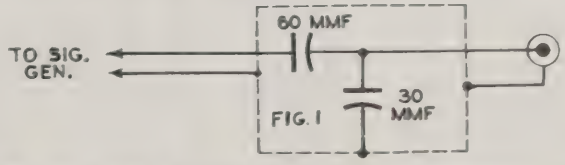
| | |
|---|---|
| TRADE NAME | Motorola, Model SROB (Ch. OB) |
| MANUFACTURER | Motorola Inc., 4545 Augusta Blvd., Chicago 51, Illinois |
| TYPE SET | Battery Operated Custom Built Automotive Superheterodyne Receiver |
| TUBES (SIX) | Types 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AV6 DET-AVC-AF, 6AS5 Power Output, 6X4 Rectifier |
| POWER SUPPLY | 6 Volt Storage Battery — RATING 5.2 Amp. at 6 Volts DC |
| TUNING RANGE—BROADCAST | 540-1600KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis. | 455KC (400 ∿ Mod.) | Tuning cores fully out | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | See fig 1. | High side thru dummy to antenna terminal. Low side to chassis. | 1610KC | " | " | A5, A6, A7 | Check to see that all tuning cores project 1 1/8 inches out of the can. Adjust A5, A6 and A7 for maximum output. |
| 3. | " | " | 1425KC | Tune for max. output | " | A8, A9, A10 | Adjust for maximum output. Set the left hand edge of the dial pointer carriage even with the center of the hole in the dial backplate. |

AFTER RECEIVER HAS BEEN INSTALLED, FULLY EXTEND THE ANTENNA AND TUNE IN A WEAK STATION NEAR 1400KC. ADJUST A7 FOR MAXIMUM VOLUME.

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# PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL SROB

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: MOTOROLA PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| V1 | RF Amp. | 6BA6 | 6BA6 | 7BK | |
| V2 | Converter | 6BE6 | 6BE6 | 7CH | |
| V3 | IF Amp. | 6BA6 | 6BA6 | 7BK | |
| V4 | DET-AVC-AF | 6AV6 | 6AV6 | 7BT | |
| V5 | Power Output | 6AS5 | 6AS5 | 7CV | |
| V6 | Rectifier | 6X4 | 6X4 | 5BS | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: MOTOROLA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 10 | 250 | 23A591500 | AF33F4A | | UP15D25C | | EL-331 | ■ Filter |
| B | 10 | 250 | | | | | | | ▲ Filter |
| C | 10 | 25 | | | | | | | Output Cathode Bypass |
| C2 | .006 | 100 | 8A4529 | P488-006 | D6-562 | PTE6D6 | GP2M-0056 | TM-26 | Ant. Coupling |
| C3 | 100 | | 21B77562 | GP100K | D6-101 | 5W5T1 | GPIK-100 | 1FM-31 | Fixed Trimmer |
| C4 | .05 | 100 | 8K13514 | P288-05 | | PTE4S5 | | TM-15 | AVC Filter |
| C5 | .05 | 200 | 8R23146 | P288-05 | | PTE4S5 | | TM-15 | Decoupling |
| C6 | 5 | | 21K70720 | GP5K | D2-4.7 | 5W5V5 | NPOK-5 | MS-55 | RF Coupling |
| C7 | 50 | 300 | 21R6513 | 1468-00005 | D6-500 | 5W5T3 | GPIK-50 | 1FM-45 | Osc. Grid Cap. |
| C8 | .01 | 100 | 8K472754 | P488-01 | D6-103 | PTE4S1 | 821-01 | TM-11 | Audio Coupling |
| C9 | .01 | 400 | 8R23690 | P488-01 | D6-103 | PTE4S1 | 821-01 | TM-11 | Audio Coupling |
| C10 | 250 | 500 | 21R6543 | 1468-00025 | D6-251 | 5W5T25 | GP2K-250 | 1FM-325 | Output Grid Bypass |
| C11 | .01 | 400 | 8R23690 | P488-01 | D6-103 | PTE4S1 | 821-01 | TM-11 | Output Plate Bypass |
| C12 | .03 | 600 | 8K592154 | P688-03 | | PTE6S3 | | TM-13 | Buffer |
| C13 | .5 | 100 | 8K17028 | P288-5 | | GT2P5 | | 68P20 | Hash Filter |
| C14 | .5 | 100 | 8K17028 | P288-5 | | GT2P5 | | 68P20 | Hash Filter |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: MOTOROLA PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 500KΩ | ½ | 18A591978 | Q13-133 | AG-60-Z | | Volume control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | | Attach to R1A per instructions |
| C | Switch | | Not Req. | 76-1 | SWB | | Attach to R1A per instructions |

## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: MOTOROLA PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R2 | 470KΩ | ½ | 6R6032 | BTS-470K | RF Grid |
| R3 | 470Ω | ½ | | BTS-470 | RF Cathode-See Note 1 |
| R4 | 100KΩ | ½ | 6R6075 | BTS-100K | Conv. Grid |
| R5 | 47KΩ | ½ | 6R6056 | BTS-47K | Osc. Grid |
| R6 | 1 Meg. | ½ | 6R6004 | BTS-1 Meg. | AVC Network |
| R7 | 390Ω | ½ | 6R5554 | BW-½-390 | IF Cathode-See Note 2 |
| R8 | 3900Ω | 1 | 6R5618 | BTA-3900 | Decoupling |
| R9 | 4.7 Meg. | ½ | 6R2122 | BTS-4.7 Meg. | AF Amp. Grid |
| R10 | 220KΩ | ½ | 6R6015 | BTS-220K | AF Amp. Plate-See Note 3 |
| R11 | 470KΩ | ½ | 6R6032 | BTS-470K | Output Grid-See Note 4 |
| R12 | 270Ω | 1 | 6R6336 | BW-1-270 | Output Cathode |
| R13 | 2200Ω | 1 | 6R6006 | BW-1-2200 | Filter |
| R14 | 56Ω | ½ | 6R5614 | BW-½-56 | Hash Suppression |
| R15 | 56Ω | ½ | 6R5614 | BW-½-56 | Hash Suppression |

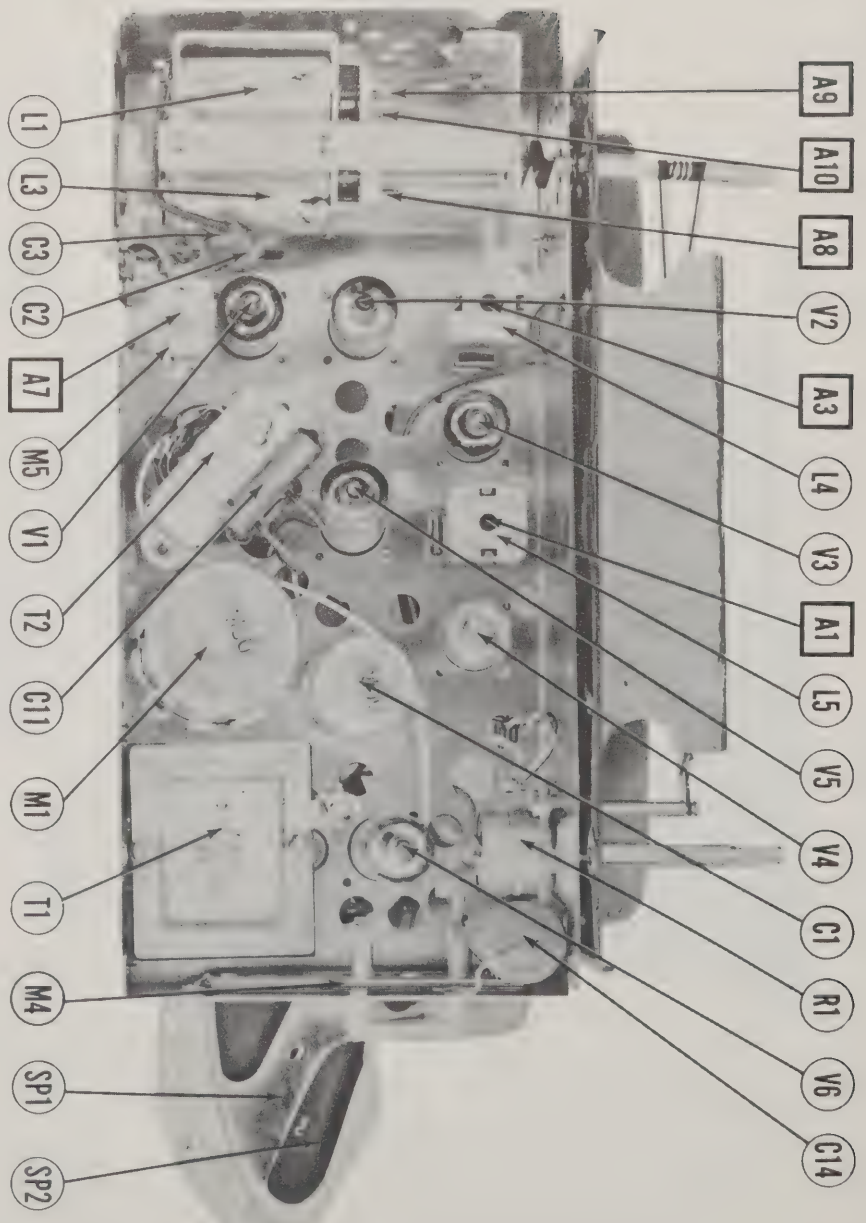
Note 1. Some models use 390Ω resistor in this application.
Note 2. Some models use 270Ω resistor in this application.
Note 3. Some models use 470KΩ resistor in this application.
Note 4. Some models use 220KΩ resistor in this application.

## TRANSFORMER (VIBRATOR)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. |
|---|---|---|---|---|---|---|---|---|
| T1 | 6VDC ② 2.4A | 340VCT .045ADC | | | 25B591533 | | P-2971 ① | |

① Drill new mounting holes.

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | MOTOROLA PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | |
| T2 | 6.2KΩ | 3.6Ω | 340Ω | .3Ω | 25B70171 | A-3877 | A-2930 | RO-13 ② | ② Drill one new mounting hole. |

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|
| | | | MOTOROLA PART No. | VIKING PART No. | QUAM PART No. | |
| | FIELD | V. C. IMP. | | | | |
| SP1 | PM | 3.6Ω | 50B592479 | 57J9 | 57A1 | |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2 | 7 x 4 3/4" | 9/16" | | | | |

## R F COILS

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | |
|---|---|---|---|---|---|---|
| | | PRI. | SEC. | MOTOROLA PART No. | MEISSNER PART No. | |
| L1 | Ant. Coil | 11Ω | | 24B71881 | | |
| L2 | RF Coil | 11Ω | | 24B71881 | | |
| L3 | Osc. Coil | 1Ω | 3.5Ω | 24B592153 | | |
| L4 | 1st IF | 17Ω | 17Ω | 24B485553 | 16-6678 | |
| L5 | 2nd IF | 17Ω | 19Ω | 24B485554 | 16-6678 | |
| L6 | Hash Choke | .2Ω | | 24A472535 | | |

## VIBRATOR

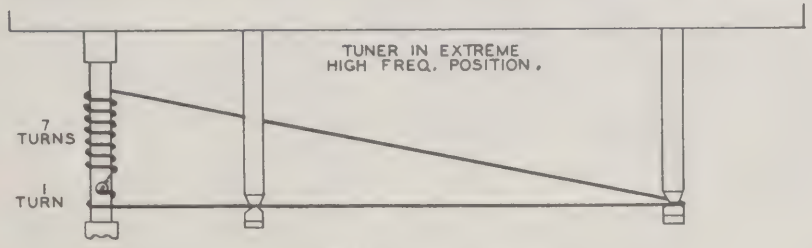
| ITEM No. | TYPE | INPUT VOLTS | FREQUENCY | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | MOTOROLA PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | RADIART PART No. | |
| M1 | Int. | 6V | 115 ∿ | 48B3333 | A-200 | C42M | 5342M | |

## DIAL LIGHTS

| ITEM No. | BASE TYPE | VOLTS | AMPS. | BEAD COLOR | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|---|
| | | | | | MOTOROLA PART No. | | |
| M2 | Bayonet | 6-8 | .15 | Brown | 65X10867 | | Type #47 |

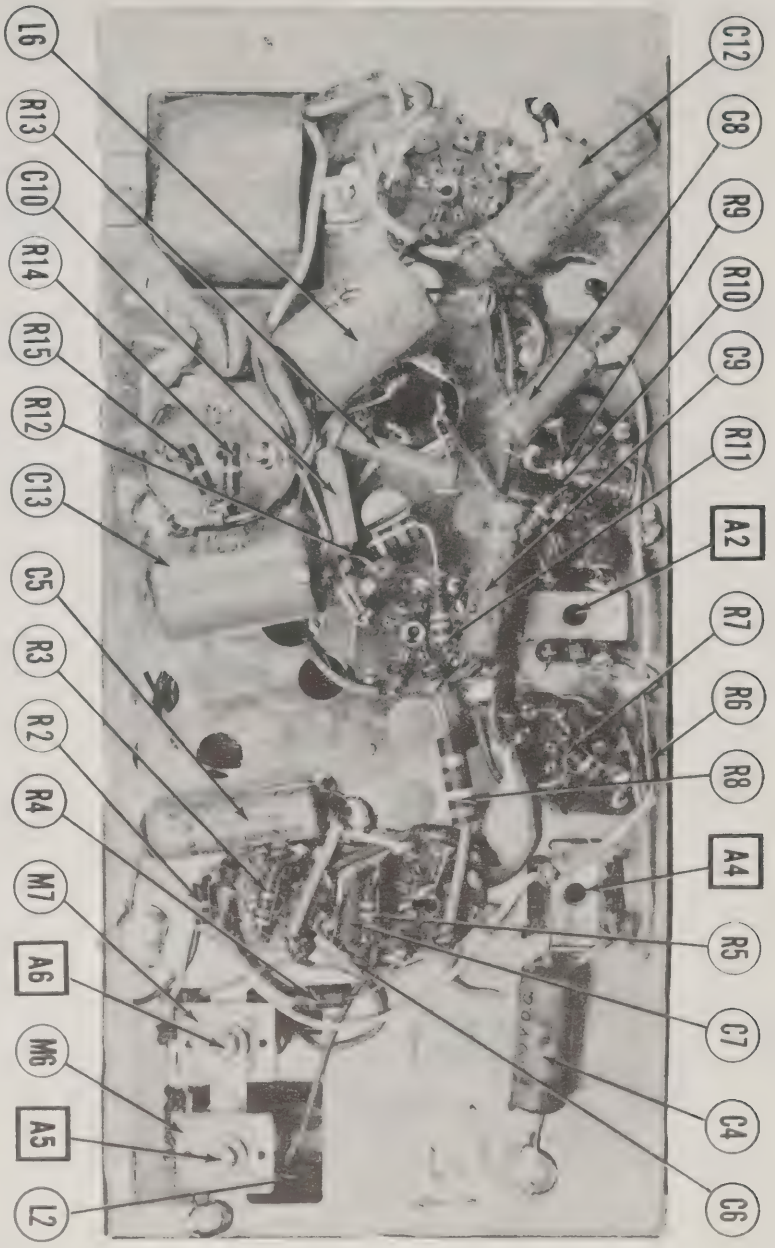
## MISCELLANEOUS

| ITEM No. | PART NAME | MOTOROLA PART No. | NOTES |
|---|---|---|---|
| M3 | Fuse | 65A10266 | 10 Amp. 3 AG |
| M4 | Spark Plate | 1B592173 | |
| M5 | Trimmer | 20K591969 | Ant. Adj. (A7) |
| M6 | Trimmer | 20A481526 | RF Adj. (A6) |
| M7 | Trimmer | 20A591977 | Osc. Adj. (A5) |
| | Knob | 36K591949 | Control |
| | Dial Pointer | 1K592062 | Assembly |
| | Dial Scale | 34B592149 | |




DIAL CORD DRIVE

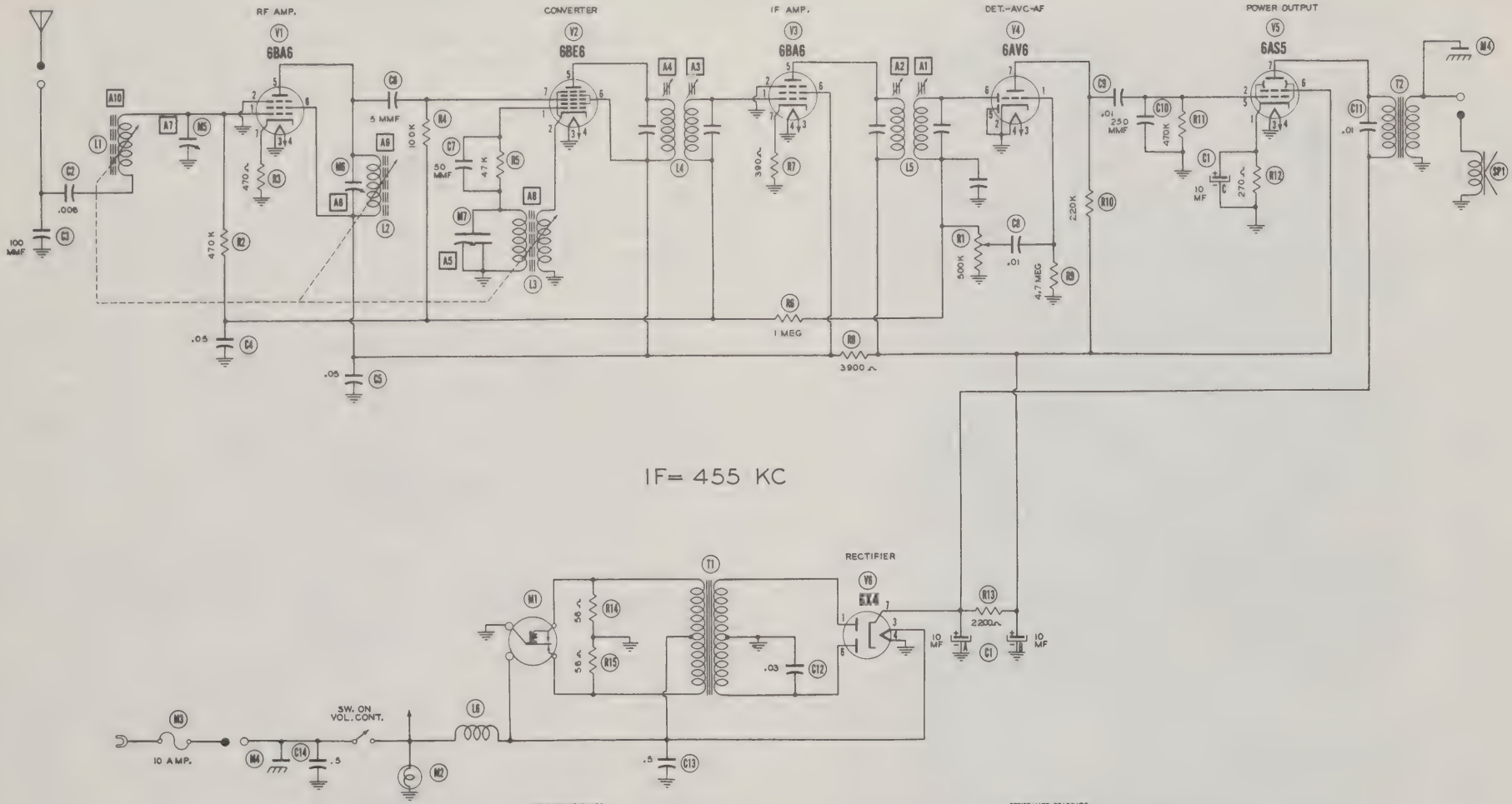
# CHASSIS—BOTTOM VIEW






MOTOROLA MODEL SR0B

MOTOROLA MODEL SR0B




VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 6BA6 | -.2VDC | 0V. | 0V. | 6.3VDC | 65VDC | 65VDC | -1.5VDC |
| V 2 | 6BE6 | ‖-2.6VDC | 0V. | 0V. | 6.3VDC | 65VDC | 65VDC | -.2VDC |
| V 3 | 6BA6 | -.2VDC | 0V. | 6.3VDC | 0V. | 110VDC | 65VDC | 1.4VDC |
| V 4 | 6AV6 | -.3VDC | 0V. | 6.3VDC | 0V. | 0V. | -.5VDC | 80VDC |
| V 5 | 6A85 | 8.4VDC | 0V. | 0V. | 6.3VDC | 0V. | 110VDC | 130VDC |
| V 6 | 6X4 | 170VAC | 0V. | 6.3VDC | 0V. | 0V. | 170VAC | 140VDC |

‖ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 6BA6 | 3 Meg. | 0Ω | 0Ω | .1Ω | †6KΩ | †6KΩ | 470Ω |
| V 2 | 6BE6 | 47KΩ | 1Ω | 0Ω | .1Ω | †6KΩ | †6KΩ | 1.6 Meg. |
| V 3 | 6BA6 | 1.5 Meg. | 0Ω | .1Ω | 0Ω | †2.2KΩ | †6KΩ | 390Ω |
| V 4 | 6AV6 | 4.7 Meg. | 0Ω | .1Ω | 0Ω | 0Ω | 500KΩ | †222KΩ |
| V 5 | 6A85 | 270Ω | 470KΩ | 0Ω | .1Ω | 470KΩ | †2.2KΩ | †340Ω |
| V 6 | 6X4 | 420Ω | Inf. | .1Ω | 0Ω | Inf. | 420Ω | 80KΩ |

† MEASURED FROM PIN 7 OF V6.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

POLICALARM MODEL PR-31

| | |
|---|---|
| TRADE NAME | Policalarm , Model PR-31 |
| MANUFACTURER | Radio Apparatus Corp., Fountain Square Theatre Bldg., Indianapolis, Indiana |
| TYPE SET | AC-DC Operated FM Superheterodyne Receiver |
| TUBES (SIX) | Types 12AT7 Converter, 6BJ6 1st FM IF Amp., 6BJ6 2nd FM IF Amp., 19T8 Ratio Det.-AF Amp., 35B5 Power Output, 35W4 Rectifier |
| POWER SUPPLY | 110-120 Volts AC |
| RATING | .27 Amp. at 117 Volts AC |
| TUNING RANGE—FREQ. MOD. | 30-50MC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial.

Use isolation transformer if available. If not connect a .1MFD capacitor in series with low side of the signal generator and chassis.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (± 1%) resistors in series from point A to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (Grid) of 12AT7 (V1). Low side to chassis. | 10.7MC (Unmod.) | Tuning gang fully open | DC Probe to Point Ⓐ. Common to chassis. | A1, A2, A3, A4, A5 | Adjust for maximum deflection. Attenuate signal generator to maintain a maximum -2 volts reading. |
| 2. | .01MFD | " | " | " | DC Probe to Point Ⓑ. Common to Point Ⓒ. | A6 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (Grid) of 12AT7 (V1). Low side to chassis. | 10.7MC (450KC Sweep) | Tuning gang fully open | Vert. Amp. to Point Ⓐ. Low side to chassis. | A1, A2, A3, A4, A5 | Disconnect stabilizer capacitor C2. Adjust for maximum amplitude and symmetry as per figure 1. |
| 2. | .01MFD | " | " | " | Vert. Amp. to Point Ⓑ. Low side to chassis. | A6 | Reconnect capacitor C2. Adjust A6 to place 10.7MC marker at center of crossover lines as per figure 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of crossover lines. |

RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 3. | Direct | High side to antenna terminal marked "1". Low side to terminal marked "2". | 46MC (Unmod.) | 46MC | DC Probe to Point Ⓐ. Common to chassis. | A7, A8 | Adjust for maximum deflection. Attenuate signal generator to maintain a maximum 2 volts reading. |
| 4. | Direct | " | 34MC (Unmod.) | 34MC | " | A9 | Adjust for maximum deflection. |
| 5. | Direct | " | " | " | " | L4 | Adjust by expanding or compressing coil turns for maximum deflection. Repeat steps 3, 4 and 5 until no further improvement can be made. |

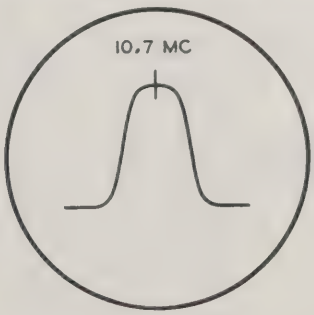


FIG. 1

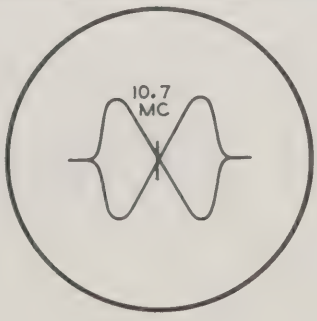


FIG. 2

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

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# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| | | POLICALARM PART No. | STANDARD REPLACEMENT | | |
| V1 | Converter | 12AT7 | 12AT7 | 9A | |
| V2 | 1st FM IF | 6BJ6 | 6BJ6 | 7CM | |
| V3 | 2nd FM IF | 6BJ6 | 6BJ6 | 7CM | |
| V4 | Ratio Det. -AF | 19T8 | 19T8 | 9E | |
| V5 | Power Output | 35B5 | 35B5 | 7BZ | |
| V6 | Rectifier | 35W4 | 35W4 | 5BQ | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | POLICALARM PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | |
| C1A | 50 | 150 | 300-061-2 | PRS1010D4A | | EDL5315C | | TVA-3430 | Filter-Red |
| B | 30 | 150 | | | | | | | Filter-Blue |
| C | 20 | 25 | | | | | | | Output Cath. Byp-Yel. |
| C2 | 2 | 50 | 300-109-1 | PRS150/4 | | BBR2-50 | | TVA-1301 | Stabilizing Cap. |
| C3 | 270 | | | GP270M | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Ant. Coupling |
| C4 | 5000 | | | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | Ant. Isolation |
| C5 | 30 | | | SI30JNPO | D2-30 | 5R5Q3 | NPOL-30 | MS-43 | Fixed Trimmer |
| C6 | 75 | | | SI75JNPO | D2-75 | | NPOM-75 | | Fixed Trimmer |
| C7 | 75 | | | SI75JNPO | D2-75 | | NPOM-75 | | Fixed Trimmer |
| C8 | 30 | | | SI30JNPO | D2-30 | 5R5Q3 | NPOL-30 | MS-43 | Fixed Trimmer |
| C9 | 5000 | | | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | Conv. Cath. Byp. |
| C10 | 27 | | | GP27M | D6-270 | 5W5Q3 | GP1K-27 | MS-43 | Osc. Grid Cap. |
| C11 | 150 | 500 | | 1469-00015 | D2-150 | 5R5T15 | NPO-334-150 | MS-315 | Fixed Padder |
| C12 | 5000 | | | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | Decoupling |
| C13 | 5000 | | | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | RF Bypass |
| C14 | 5000 | | * | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st IF Cath. Byp. |
| C15 | 5000 | | | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st IF Dec. |
| C16 | 5000 | | † | GP5000M | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd IF Cath. Byp. |
| C17 | 10000 | | | GP10000M | D6-103 | PTE4S1 | 811-01 | 36C1 | 2nd IF Dec. |
| C18 | 10000 | | | GP10000M | D6-103 | PTE4S1 | 811-01 | 36C1 | 2nd IF Fil. Byp. |
| C19A | 100 | | ‡ 100-233-1 | GP100M | PC-50‡ | | GP1K-100 | 1FM-31 | Diode Load Cap. |
| B | 100 | | | GP100M | | | GP1K-100 | 1FM-31 | Diode Load Cap. |
| C20 | 1000 | | | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | De-emphasis |
| C21 | .01 | 400 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C22 | 470 | | | GP470M | D6-471 | 5W5T5 | GP2K-470 | 1FM-35 | AF Amp. Plate Byp. |
| C23 | .01 | 400 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C24 | .01 | 400 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Output Plate Byp. |
| C25 | 270 | | | GP270M | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Conv. Fil. Byp. |
| C26 | 270 | | | GP270M | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | RF Bypass |

* Items C14 and R6 are combined into one unit obtainable under MFGR'S Part No. 100-229-2.
† Items C16 and R8 are combined into one unit obtainable under MFGR'S Part No. 100-229-2.
‡ Items C19A, C19B and R11 are combined into one unit

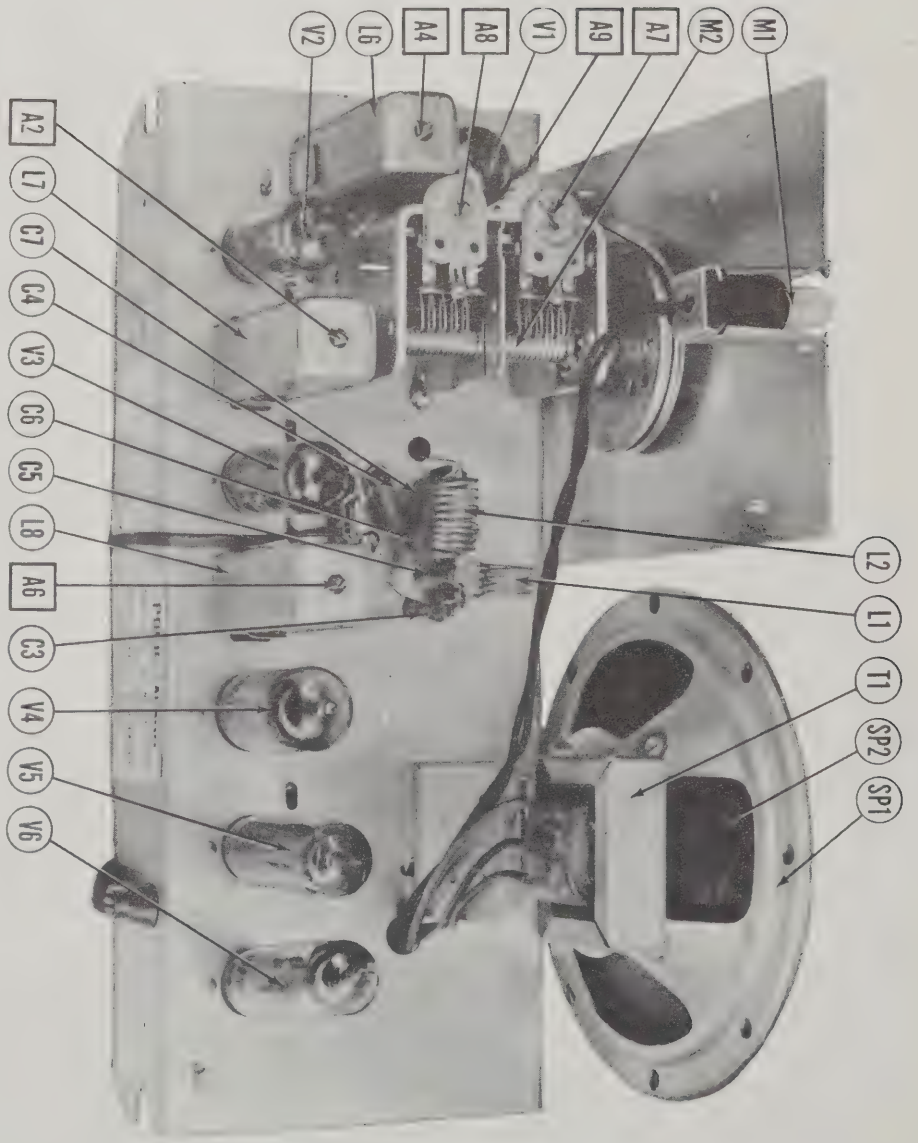
## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | POLICALARM PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | |
| R1A | 1 Meg. | ½ | 100-093-4 | Q13-137 | AG-63-Z | BSK-70-S | Volume control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | Not Req. | Attach to R1A per instructions |
| C | Switch | | Not Req. | 76-1 | SWB | Not Req. | Attach to R1A per instructions |

## RESISTORS

| ITEM No. | RATING | | REPLACEMENT DATA | | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| | RESISTANCE | WATTS | POLICALARM PART No. | IRC PART No. | |
| R2 | 68Ω | ½ | | | Parasitic Suppressor |
| R3 | 1000Ω | ½ | | BTS-1000 | Converter Cathode |
| R4 | 1000Ω | ½ | | BTS-1000 | Converter Decoupling |
| R5 | 10KΩ | ½ | | BTS-10K | Oscillator Grid |
| R6 | 82Ω | ½ | * | | 1st IF Cathode |
| R7 | 470Ω | ½ | | BTS-470 | 1st IF Decoupling |
| R8 | 82Ω | ½ | † | | 2nd IF Cathode |
| R9 | 470Ω | ½ | | BTS-470 | 2nd IF Decoupling |
| R10 | 47KΩ | ½ | | BTS-47K | De-emphasis |
| R11 | 47KΩ | ½ | ‡ | BTS-47K | Ratio Det. Diode Load |
| R12 | 10 Meg. | ½ | | BTS-10 Meg. | AF Amp. Grid |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

| | | | | | |
|---|---|---|---|---|---|
| R13 | 220KΩ | ½ | | BTS-220K | AF Amp. Plate Load |
| R14 | 470KΩ | ½ | | BTS-470K | Output Grid |
| R15 | 150Ω | 1 | | BW-1-150 | Output Cathode |
| R16 | 1000Ω | 1 | | BTA-1000 | Filter |

* Items R6 and C14 are combined into one unit obtainable under MFGR'S part No. 100-229-2.
† Items R8 and C16 are combined into one unit obtainable under MFGR'S Part No. 100-229-2.
‡ Items R11, C19A and C19B are combined into one unit. See C19 under capacitor listings.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | POLICALARM | STANCOR | MERIT | CHICAGO | |
| | PRI. | SEC. | PRI. | SEC. | PART No. | PART No. | PART No. | PART No. | |
| T1 | 1900Ω | 3.3Ω | 210Ω Tap ④ 25Ω | | Part of SP1 | A-3330 ① | A-3031 ① | RO-3 ① | ① Bend mounting tabs down and mount on original bracket. |

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|
| | | | POLICALARM | JENSEN | QUAM | |
| | | | PART No. | PART No. | PART No. | |
| | FIELD | V. C. IMP. | | ST-105 ② ④ | | ② Remount output transformer. |
| SP1 | PM | 3.3Ω | 300-071-2 | MOD. P5-X | 5A07 ② | ③ Use universal mounting bracket provided. |
| | CONE DIA. | V. C. DIA. | | | | ④ Fabricate new mounting bracket. |
| SP2 | 4 3/4" | 9/16" | | | | |

## R F COILS

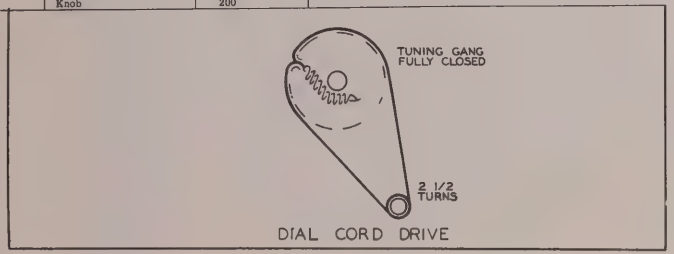
| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| | | | | POLICALARM | MEISSNER |
| | | PRI. | SEC. | PART No. | PART No. |
| L1 | Ant. Loading | 0Ω | | 300-097-1 | |
| L2 | Ant. Loading | 0Ω | | 300-097-3 | |
| L3 | Ant. Loading | 0Ω | | 300-097-1 | |
| L4 | Ant. Coil | 0Ω | | 300-097-4 | |
| L5 | Osc. Coil | 0Ω | | 300-096-2 | |
| L6 | 1st IF | .9Ω | .9Ω | 300-077-2 | 16-3487 |
| L7 | 2nd IF | .9Ω | .9Ω | 300-077-2 | 16-3487 |
| L8 | Ratio Det. Trans. | 2.5Ω | .2Ω | 106-5 | |

## DIAL LIGHTS

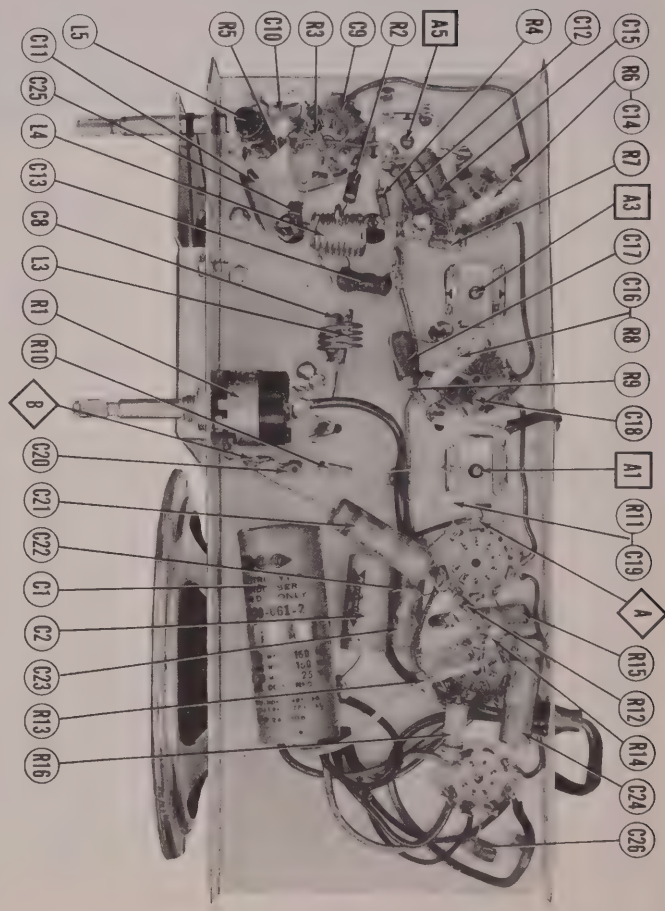
| ITEM No. | BASE TYPE | VOLTS | AMPS. | BEAD COLOR | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|---|
| | | | | | POLICALARM PART No. | | |
| M1 | Bayonet | 6-8 | .15 | Brown | | | Type #47 |

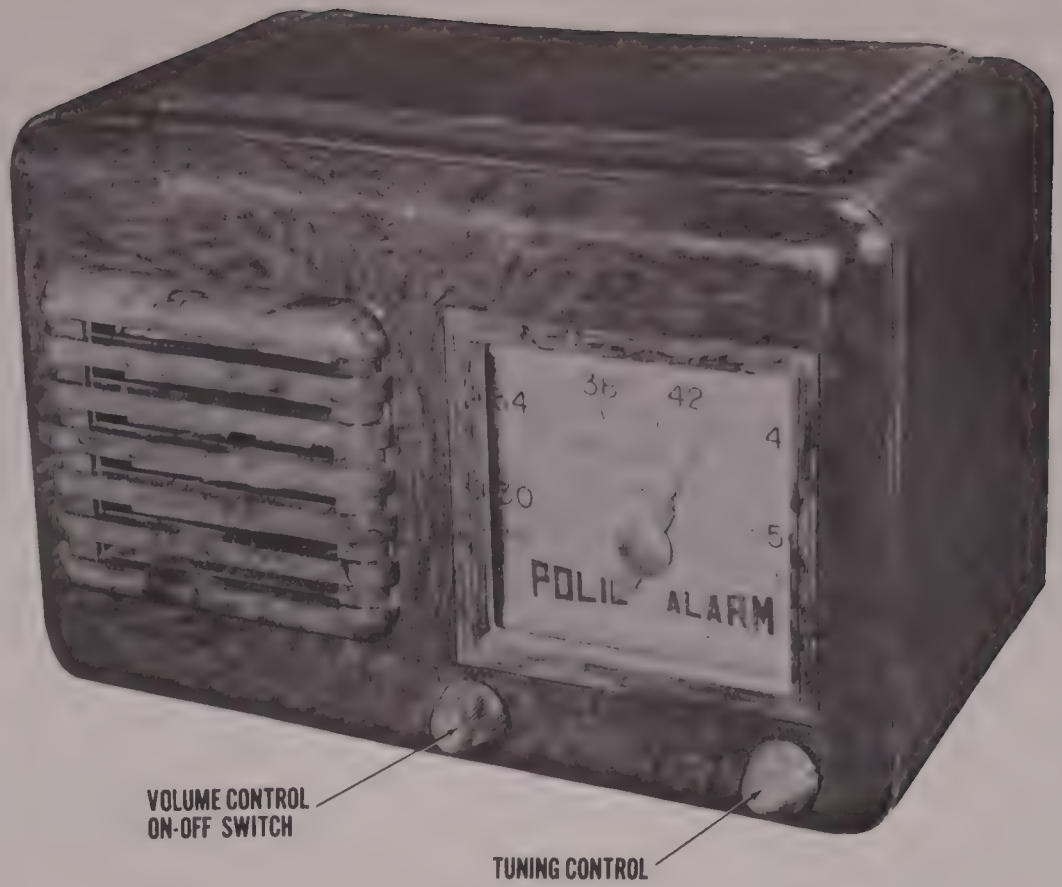
## MISCELLANEOUS

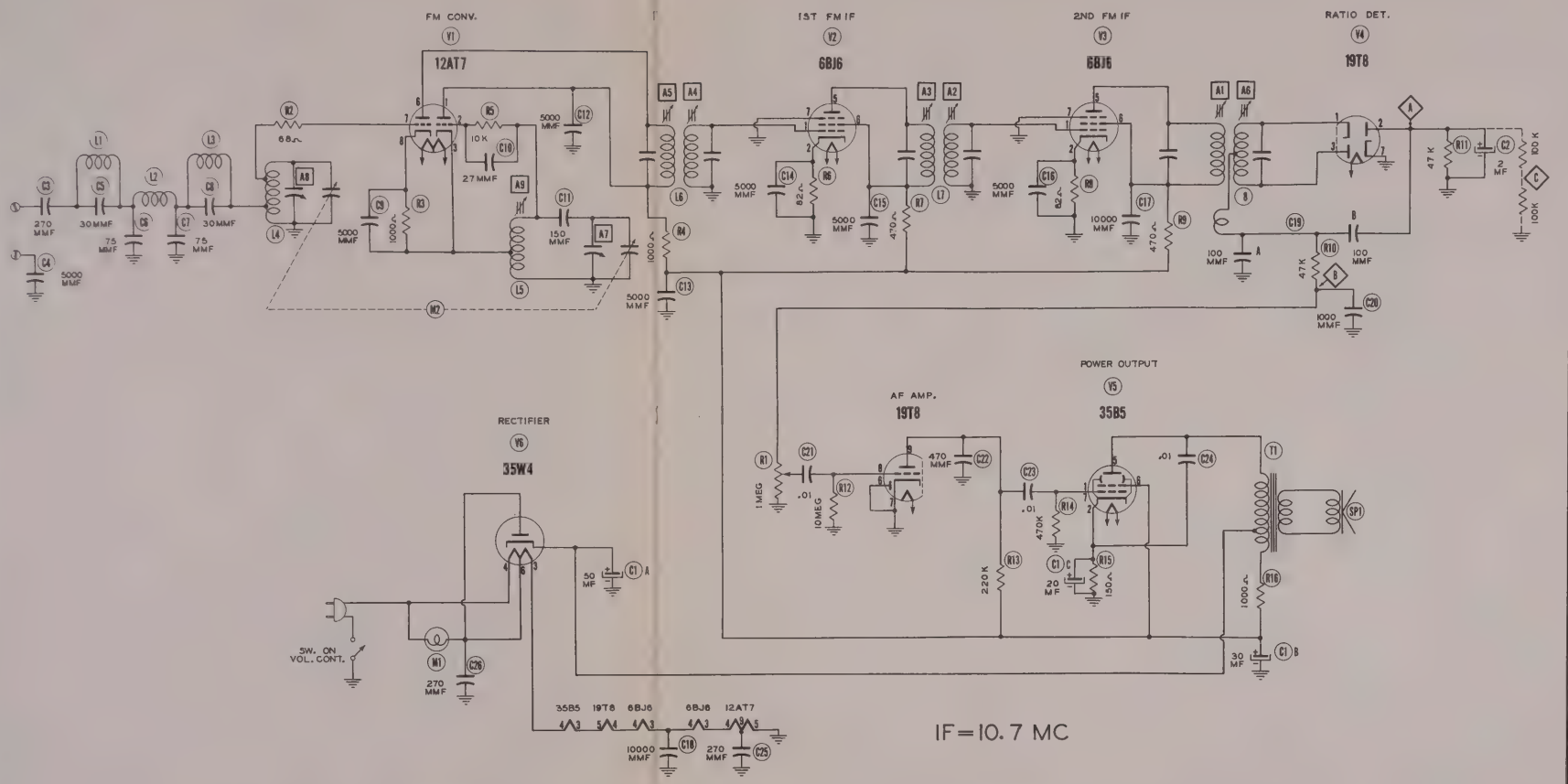
| ITEM No. | PART NAME | POLICALARM PART No. | NOTES |
|---|---|---|---|
| M2 | 2 Gang Var. Cap. | 300-060-7 | |
| | Cabinet | 29-9A | |
| | Dial Pointer | 1774E | |
| | Knob | 200 | |




## CHASSIS—BOTTOM VIEW




42
POLIC
ALARM
VOLUME CONTROL
ON-OFF SWITCH
TUNING CONTROL




VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 12AT7 | 80VDC | 8-1VDC | 0V. | 13VAC | 0V. | 80VDC | 0V. | 1.5VDC | 7VAC |
| V 2 | 6BJ6 | 0V. | .8VDC | 13VAC | 21VAC | 80VDC | 80VDC | 0V. | | |
| V 3 | 6BJ6 | 0V. | .8VDC | 21VAC | 28VAC | 80VDC | 80VDC | 0V. | | |
| V 4 | 19T8 | -.4VDC | -.6VDC | -.4VDC | 28VAC | 50VAC | 0V. | 0V. | -.8VDC | 50VDC |
| V 5 | 35B5 | 0V. | 5VDC | 50VAC | 83VAC | 110VDC | 85VDC | 0V. | | |
| V 6 | 35W4 | 120VDC | 0V. | 83VAC | 117VAC | 110VAC | 110VAC | 120VDC | | |

‖ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 12AT7 | †2KΩ | 10KΩ | 0Ω | 12Ω | 0Ω | †2KΩ | 68Ω | 1000Ω | 7Ω |
| V 2 | 6BJ6 | .9Ω | 82Ω | 12Ω | 22Ω | †1.5KΩ | †1.5KΩ | 0Ω | | |
| V 3 | 6BJ6 | .9Ω | 82Ω | 22Ω | 27Ω | †1.5KΩ | †1.5KΩ | 0Ω | | |
| V 4 | 19T8 | 1 Meg. | 47KΩ | 1 Meg. | 27Ω | 44Ω | 0Ω | 0Ω | 10 Meg. | |
| V 5 | 35B5 | 470KΩ | 150Ω | 44Ω | 80Ω | †185Ω | †1000Ω | 470KΩ | | |
| V 6 | 35W4 | †25Ω | 0Ω | 80Ω | 110Ω | [illegible] | 105Ω | 2.5 Meg. | | |

† MEASURED FROM PIN 7 OF V8.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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# SENTINEL MODELS IU-335PG, PI, PM, PW, 335PG, PI, PM, PW

SENTINEL MODELS IU-335PG, PI, PM, PW, 335PG, PI, PM, PW

SENTINEL MODELS IU-335PG, PI, PM, PW, 335PG, PI, PM, PW

SENTINEL MODEL 335PM

| | |
|---|---|
| TRADE NAME | Sentinel, Models IU-335PG, IU-335PI, IU-335PM, IU-335PW, 335PG, 335PI, 335PM, 335PW |
| MANUFACTURER | Sentinel Radio Corp., 2100 W. Dempster St., Evanston, Illinois |
| TYPE SET | Three Power Operated Portable Superheterodyne Receiver with Loop Antenna |
| TUBES (FOUR) | Types 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3V4 Power Output |
| POWER SUPPLY | 110-120 Volts AC-DC or 4.5 Volts "A" Supply and 90 Volts "B" Supply |
| RATING | .14 Amp. at 117 Volts AC or 100MA at 4.5 Volts DC and 9.5 MA at 90 Volts DC |
| TUNING RANGE—BROADCAST | 540-1700KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning gang fully closed and set pointer even with outside edge of the first 5 in the 55 calibration number at low frequency end of dial.

Connect a 1 Meg. resistor across antenna terminals.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .2MFD | High side to pin 6 of 1R5 (Grid) of (V1). Low side to B-. | 455KC (400 ∿ Mod.) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation. |
| 2. | .2MFD | " | 1730KC | " | " | A5 | " |
| 3. | REPLACE RECEIVER BACK IN CABINET AND DISCONNECT 1 MEG. RESISTOR. | | | | | | |
| 4. | | Loop | 1400KC | Tune for max. output | Across voice coil | A6 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |

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# PARTS LIST AND DESCRIPTIONS

SENTINEL MODEL 335PM

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: SENTINEL PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| V1 | Converter | 1R5 | 1R5 | 7AT | |
| V2 | IF Amp. | 1U4 | 1U4 | 6AR | |
| V3 | DET.-AVC-AF | 1U5 | 1U5 | 6BW | |
| V4 | Power Output | 3V4 | 3V4 | 6BX | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: SENTINEL PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 40 | 150 | 25E28 | AFH88D20R | | UP5315C | | TVL-3427 | ■ Filter |
| B | 40 | 150 | | | | 10 | | | ▲ Filter |
| C | 100 | 10 | | | | | | | Filament Bypass |
| C2 | .05 | 200 | 23E216 | P288-05 | DF-503 | PTE4S5 | | TM-15-2 | AVC Filter |
| C3 | 100 | | 23E24 | GP100M | D6-101 | 5W5T1 | GPIK-100 | 1FM-31 | Osc. Grid Cap. |
| C4 | .01 | 200 | 23E211 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11-4 | Osc. Anode Bypass |
| C5 | .2 | 200 | 23E220 | P488-22 | | GT2P25 | | TM-2-2 | Filament Bypass |
| C6 | .2 | 200 | 23E220 | P488-22 | | GT2P25 | | TM-2-2 | Filament Bypass |
| C7 | 100 | | 23E24 | GP100M | D6-101 | 5W5T1 | GPIK-100 | 1FM-31 | Diode RF Filter |
| C8A | 2000 | | 23E2024 | BPD-002 | DD-202 | PTE6D2 | 811-002 | 29C2 | Audio Coupling |
| B | 5000 | | | BPD-005 | DD-502 | PTE6D5 | 811-005 | 29C1 | AF Amp. Screen |
| C | 100 | | | GP100M | D6-101 | 5W5T1 | GPIK-100 | 1FM-31 | AF Amp. Plate |
| D | 5000 | | | BPD-005 | DD-502 | PTE6D5 | 811-005 | 29C1 | Audio Coupling |
| C9 | .005 | 400 | 23E408 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Output Plate Bypass |
| C10 | .05 | 400 | 23E416 | P488-05 | DF-503 | PTE4S5 | | TM-15-4 | Line Filter |

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: SENTINEL PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 2 Meg. | ½ | 28E30 | Q13-139 | AG-66-Z | AN-76 | Volume control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-4 | Attach to R1A per instructions |
| C | Switch | | Not Req. | 76-2 | SWB-2 | K-157 | Attach to R1A per instructions |

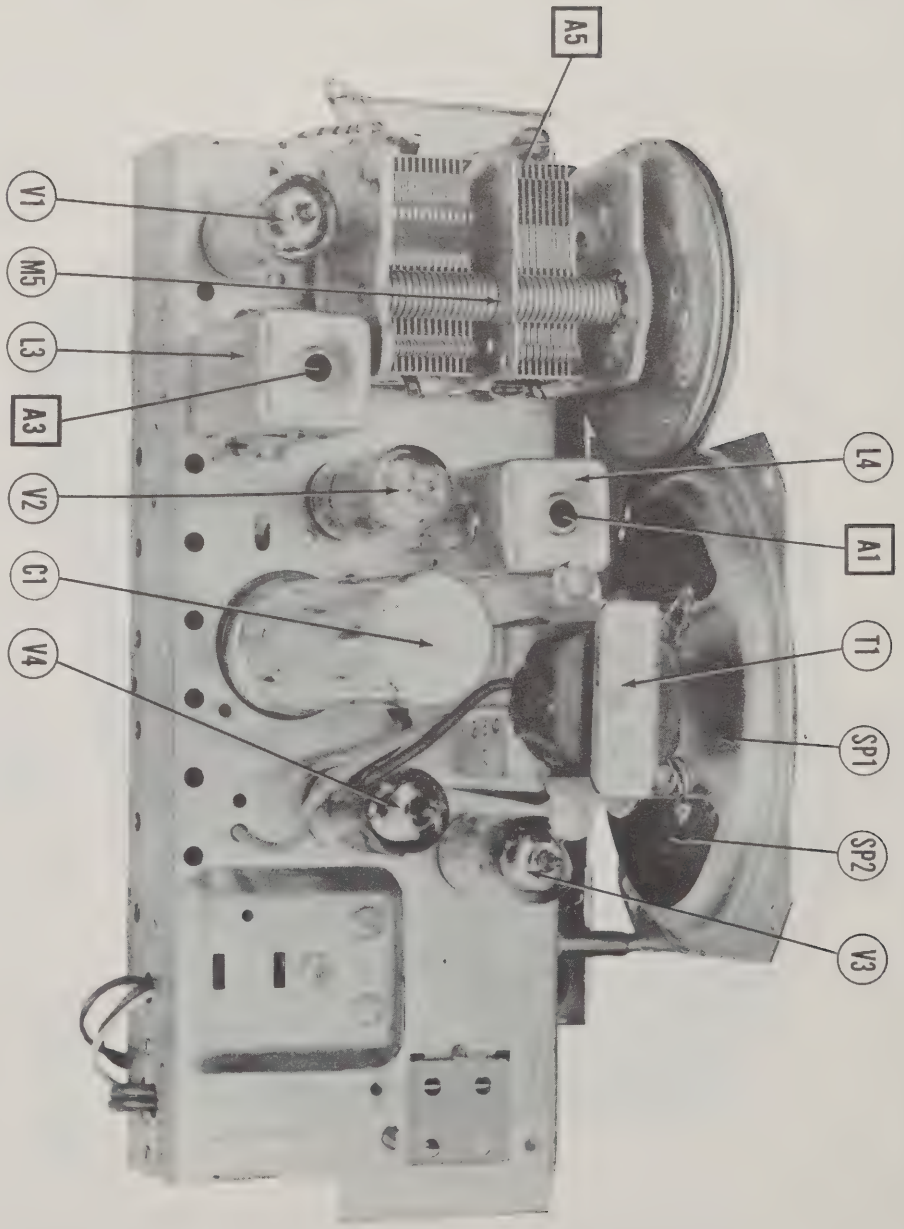
## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: SENTINEL PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R2 | 68KΩ | ½ | 27E683 | BTS-68K | Osc. Grid |
| R3 | 6800Ω | ½ | 27E682 | BTS-6800 | Osc. Anode |
| R4 | 470Ω | ½ | 27E471 | BTS-470 | Filament String |
| R5 | 4.7 Meg. | ½ | 27E475 | BTS-4.7 Meg. | AVC Network |
| R6 | 4.7 Meg. | ½ | 27E475 | BTS-4.7 Meg. | AVC Network |
| R7 | 270Ω | ½ | 27E271 | BTS-270 | Filament String |
| R8 | 330Ω | ½ | 27E331 | BTS-330 | Bias Network |
| R9 | 470KΩ | ½ | 27E474 | BTS-470K | Bias Network |
| R10 | 100KΩ | ½ | 27E104 | BTS-100K | Bias Network |
| R11 | 4.7 Meg. | ½ | 27E475 | BTS-4.7 Meg. | AF Amp. Grid |
| R12 | 4.7 Meg. | ½ | 27E475 | BTS-4.7 Meg. | AF Amp. Screen |
| R13 | 1 Meg. | ½ | 27E105 | BTS-1 Meg. | AF Amp. Plate |
| R14 | 2.2 Meg. | ½ | 27E225 | BTS-2.2 Meg. | Output Grid |
| R15A | 1810Ω | 8 | 27E1005 | | Filament Dropping-Wire Wound |
| B | 610Ω | | | | Filter-Wire Wound |
| R16 | 68Ω | 1 | 27E680-3 | | Surge Limiter |
| R17 | 33Ω | ½ | 27E330-2 | BW-½-33 | Filament Dropping |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING: IMPEDANCE PRI. | RATING: IMPEDANCE SEC. | RATING: DC RES. PRI. | RATING: DC RES. SEC. | REPLACEMENT DATA: SENTINEL PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 8700Ω | 4.1Ω | 340Ω | .5Ω | Part of SP1 | A-3329 | A-2927 ① | RO-16 ① | ① Drill one new mounting hole. |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA: SENTINEL PART No. | JENSEN PART No. | QUAM PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|
| | FIELD | V. C. IMP. | | ST-113 ② ④ | | ② Remount output transformer. |
| SP1 | PM | 4.1Ω | 1E29 | MOD. P4-X | 4A07 ② ③ | ③ Use universal mounting bracket provided. |
| | CONE DIA. | V. C. DIA. | | | | ④ Fabricate new mounting bracket. |
| SP2 | 4" | 9/16" | | | | |

## R F COILS

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA: SENTINEL PART No. | MEISSNER PART No. | |
|---|---|---|---|---|---|---|
| L1 | Loop Ant. | 1.5Ω | | 64E32 | | |
| L2 | Osc. Coil | 2Ω | 6Ω | 20E338 | 14-1074 | |
| L3 | 1st IF | 27Ω | 27Ω | 20E463 | 16-6668 | |
| L4 | 2nd IF | 27Ω | 27Ω | 20E463 | 16-6669 | |
| L5 | RF Choke Assembly | | | 20E407 | | Includes .1MFD capacitor not used in all models. |

## SELENIUM RECTIFIER

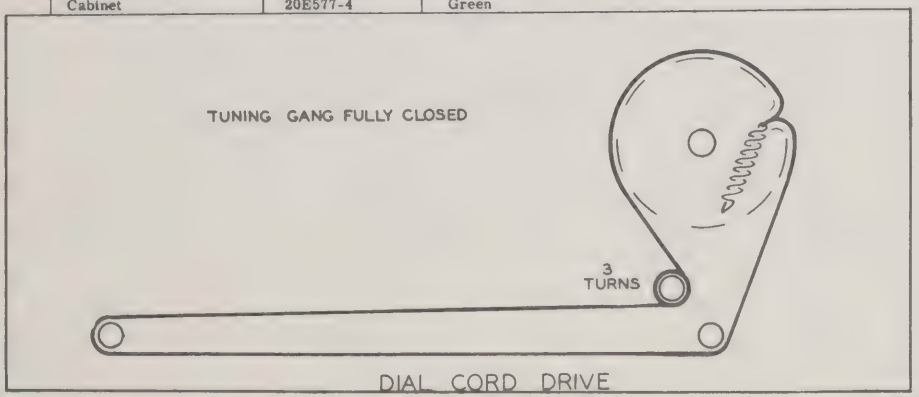
| ITEM No. | RATING: CURRENT | REPLACEMENT DATA: SENTINEL PART No. | SYLVANIA PART No. | | NOTES |
|---|---|---|---|---|---|
| M1 | .056ADC | 57E1-5 | NB-5 | | |

## BATTERIES

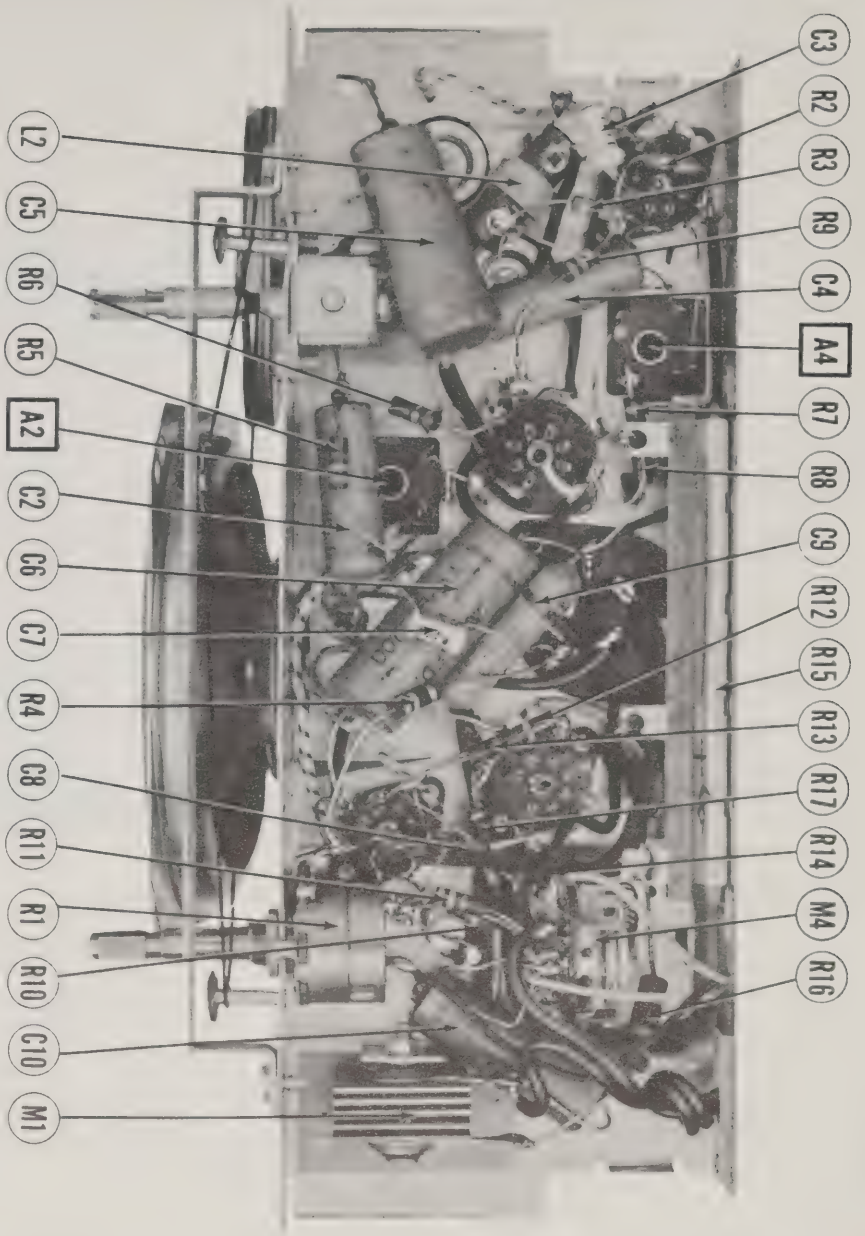
| ITEM No. | VOLTAGE | SENTINEL PART No. | REPLACEMENT DATA: EVEREADY "A" | EVEREADY "B" | EVEREADY "A-B" | BURGESS "A" | BURGESS "B" | BURGESS "A-B" | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| M2 | 4.5V "A" | A38 | 746 | | | G3 | | | |
| M3 | 90V "B" | B7634 | | 490 | | | N60 | | |

## MISCELLANEOUS

| ITEM No. | PART NAME | SENTINEL PART No. | NOTES |
|---|---|---|---|
| M4 | Switch | 29E20 | AC/DC-Battery |
| M5 | 2 Gang Var. Cap. | 24E40 | (12-487MMF, 22-232MMF) |
| A6 | Trimmer | 24E33 | Ant. Adj. |
| | Dial Pointer | 35E8-13 | |
| | Knob | 37E17-15 | Red |
| | Knob | 37E17-16 | Brown |
| | Knob | 37E17-17 | White |
| | Knob | 37E17-18 | Green |
| | Cabinet | 20E577 | Red |
| | Cabinet | 20E577-2 | White |
| | Cabinet | 20E577-3 | Brown |
| | Cabinet | 20E577-4 | Green |



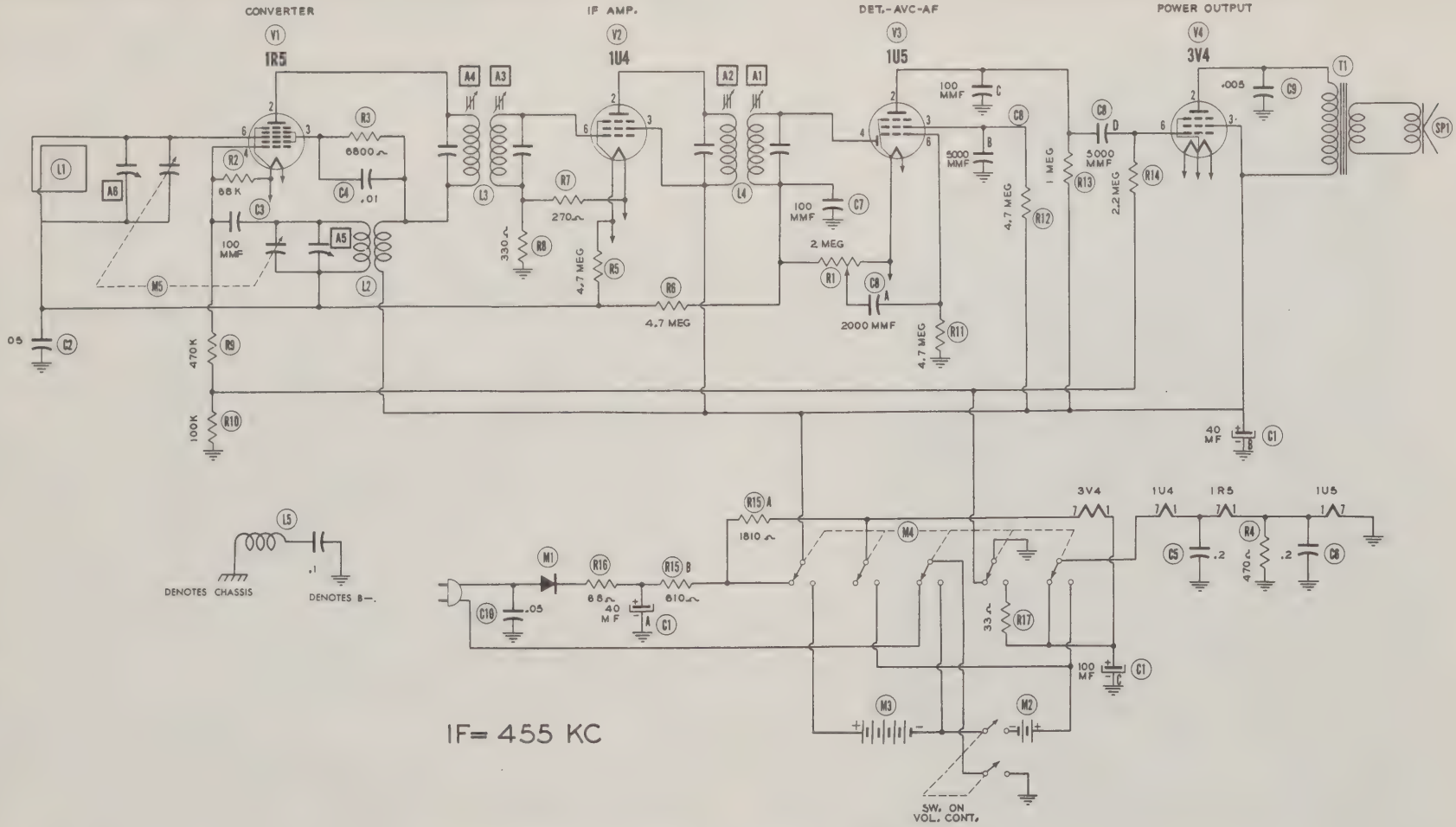

# CHASSIS—BOTTOM VIEW








SENTINEL MODEL 335PM




VOLTAGE AND RESISTANCE READINGS TAKEN IN "AC/DC" POSITION.

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 1R5 | 1.2VDC | 85VDC | 60VDC | 8-16VDC | 1.2VDC | .2VDC | 2.5VDC |
| V 2 | 1U4 | 2.5VDC | 85VDC | 82VDC | 0V. | 2.5VDC | 2.1VDC | 3.8VDC |
| V 3 | 1U5 | 1.2VDC | 6.4VDC | 4.5VDC | .2VDC | 0V. | -.1VDC | 0V. |
| V 4 | 3V4 | 3.8VDC | 80VDC | 82VDC | 0V. | 5.1VDC | 0V. | 6.3VDC |

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V 1 | 1R5 | • | †705Ω | †7.5KΩ | 68KΩ | • | 3 Meg. | • |
| V 2 | 1U4 | • | †705Ω | †680Ω | 0Ω | • | 200Ω | • |
| V 3 | 1U5 | • | †1 Meg. | †4.7 Meg. | 2 Meg. | Inf. | 4.7 Meg. | • |
| V 4 | 3V4 | • | †1000Ω | †680Ω | Inf. | • | 2.2 Meg. | • |

† MEASURED FROM OUTPUT OF M1.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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**MODEL 9104B**

STEWART-WARNER MODELS
9103B, C, 9104A, B, C

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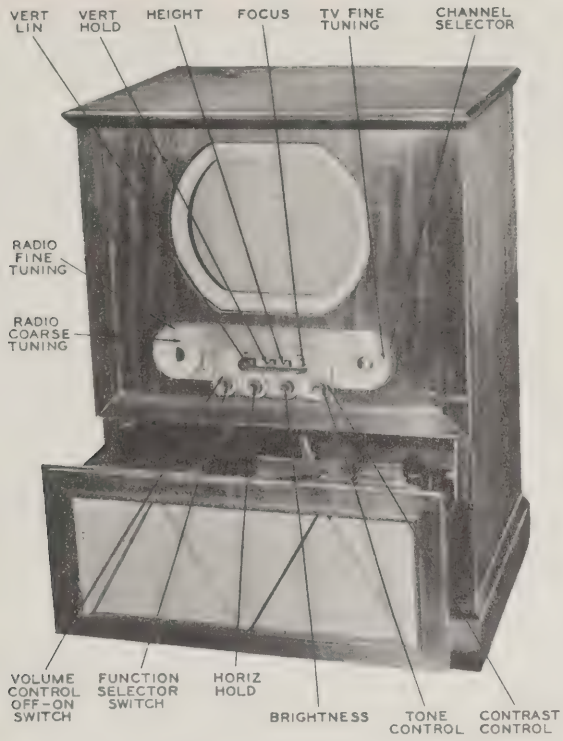
**Date 9/50 Set No. 105—Folder No. 10**

# STEWART-WARNER
# MODELS 9103-B, -C, 9104-A, -B, -C




STEWART-WARNER MODEL 9104B

| | |
|---|---|
| TRADE NAME | Stewart-Warner Models 9103B, C, 9104A, B, C |
| MANUFACTURER | Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Illinois |
| TYPE SET | TV-AM-FM-Phono Combination Receiver (Model 9103 "TV" only) |
| TUBES | Twenty-Five (Model 9103)<br>Thirty (Model 9104) |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle |
| RATING | 1.9 Amp. at 117 Volts AC (TV), 1.1 Amp. at 117 Volts AC (Radio) |
| TUNING RANGE | TV Channels 2 thru 13, AM 540-1620KC, FM 88-108MC |

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STEWART-WARNER
MODELS 9103-B, -C, 9104-A, -B, -C

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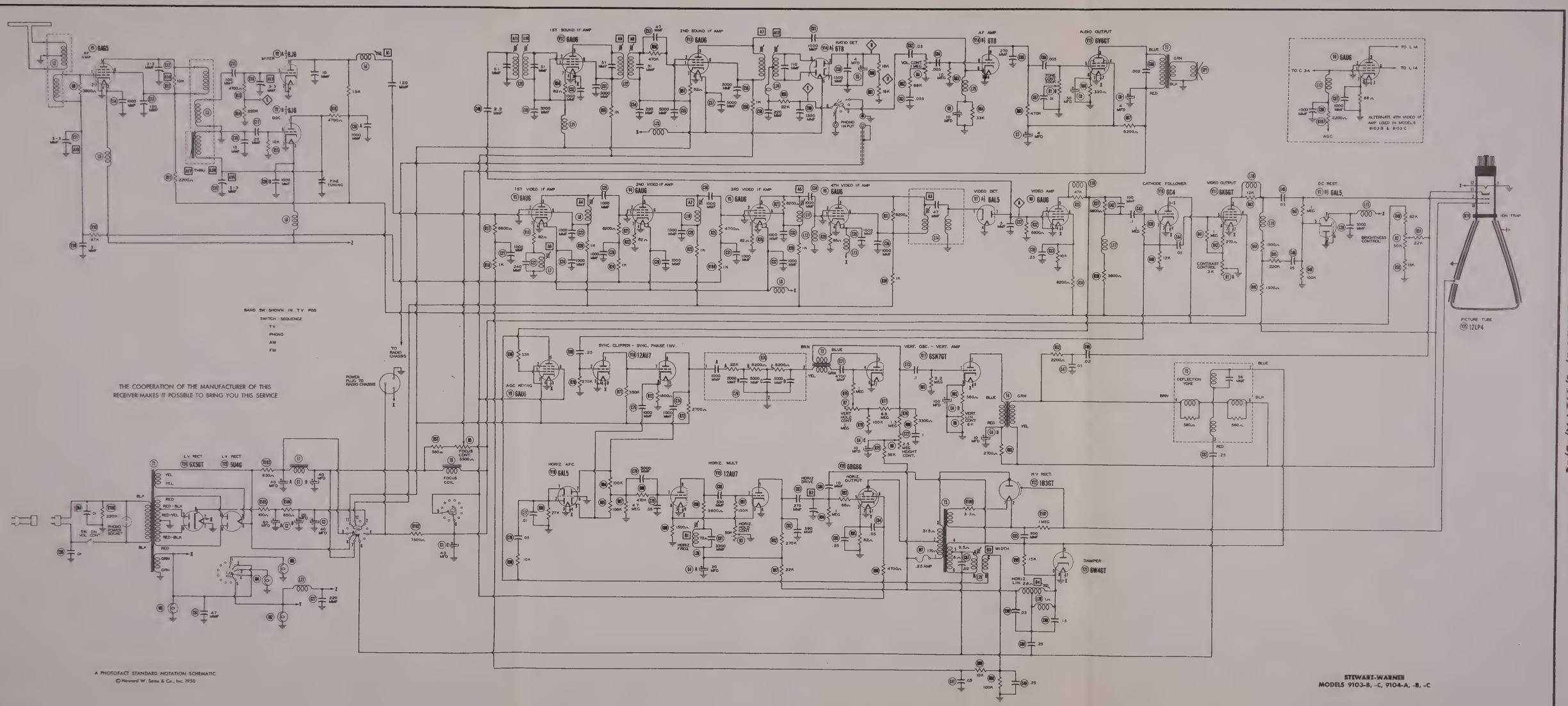
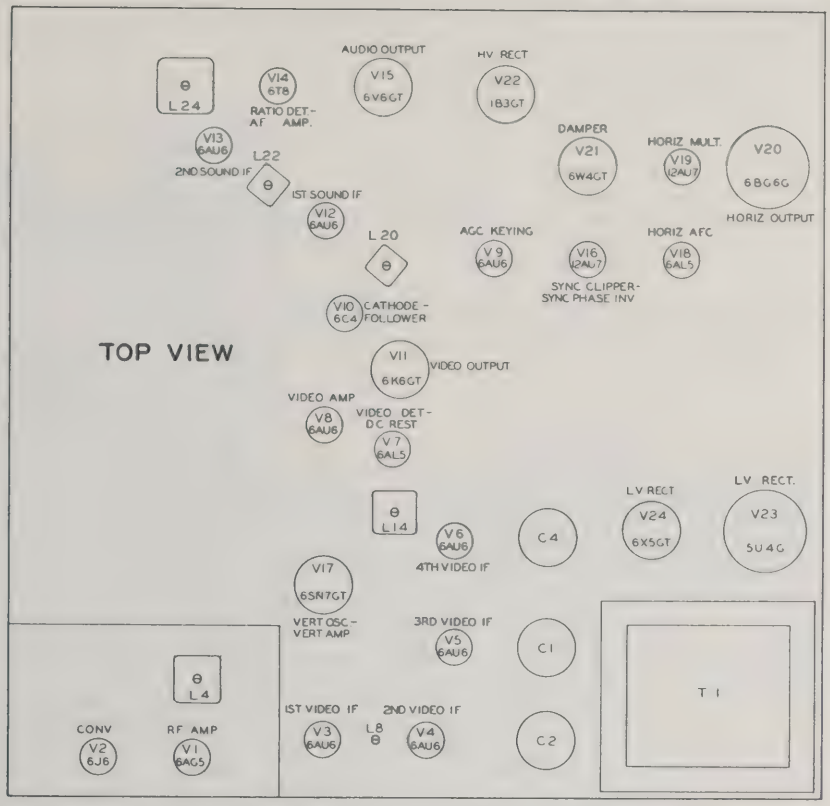
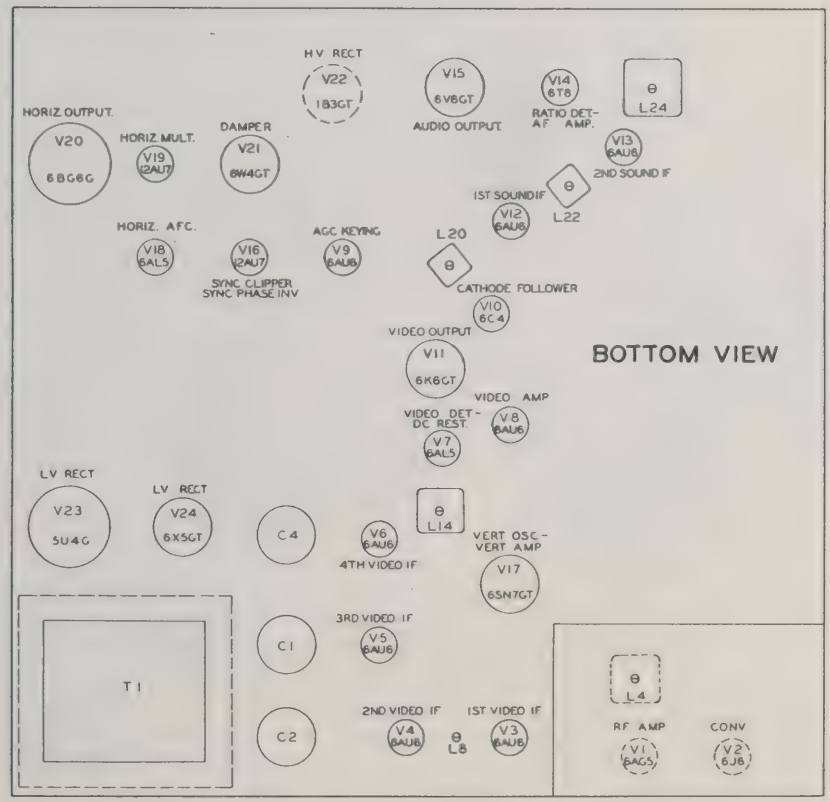
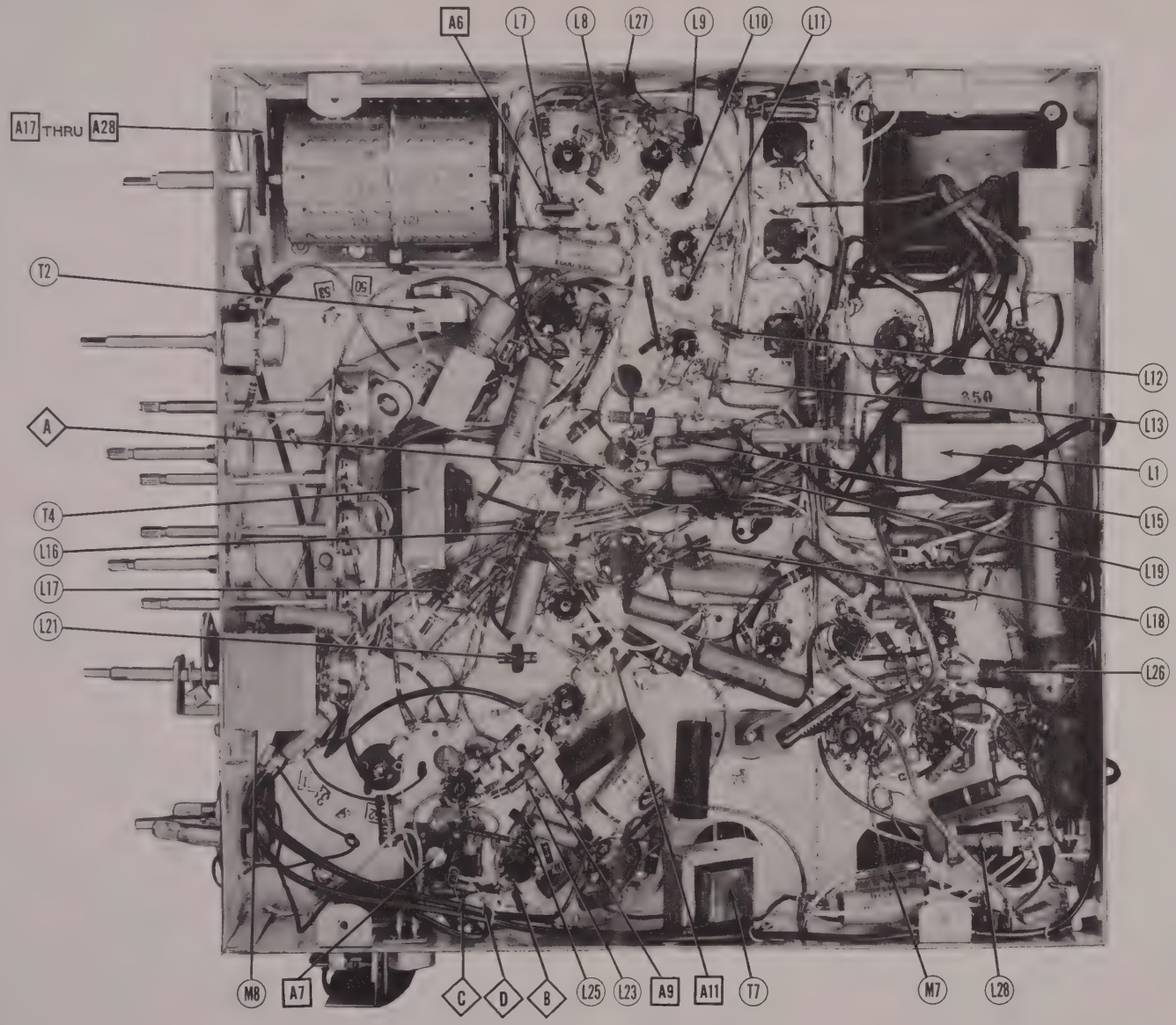

STEWART-WARNER
MODELS 9103-B, -C, 9104-A, -B, -C
1ST SOUND IF AMP
2ND SOUND IF AMP
RATIO DET
AF AMP
AUDIO OUTPUT
1ST VIDEO IF AMP
2ND VIDEO IF AMP
3RD VIDEO IF AMP
4TH VIDEO IF AMP
VIDEO DET.
VIDEO AMP
CATHODE FOLLOWER
VIDEO OUTPUT
D.C. REST.
PICTURE TUBE
ION TRAP
BRIGHTNESS CONTROL
CONTRAST CONTROL
SYNC. CLIPPER - SYNC. PHASE INV.
VERT. OSC. - VERT. AMP
HORIZ. AFC
HORIZ. MULT
HORIZ. OUTPUT
H.V. RECT.
DAMPER
WIDTH
DEFLECTION YOKE
FOCUS COIL
FOCUS CONT.
AGC KEYING
LV RECT
PHONO POWER SOCKET
POWER PLUG TO RADIO CHASSIS
TO RADIO CHASSIS
FINE TUNING
BAND SW SHOWN IN TV POS.
SWITCH SEQUENCE
TV
PHONO
AM
FM
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ALTERNATE 4TH VIDEO IF AMP USED IN MODELS 9103-B & 9103-C
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1950
STEWART-WARNER
MODELS 9103-B, -C, 9104-A, -B, -C

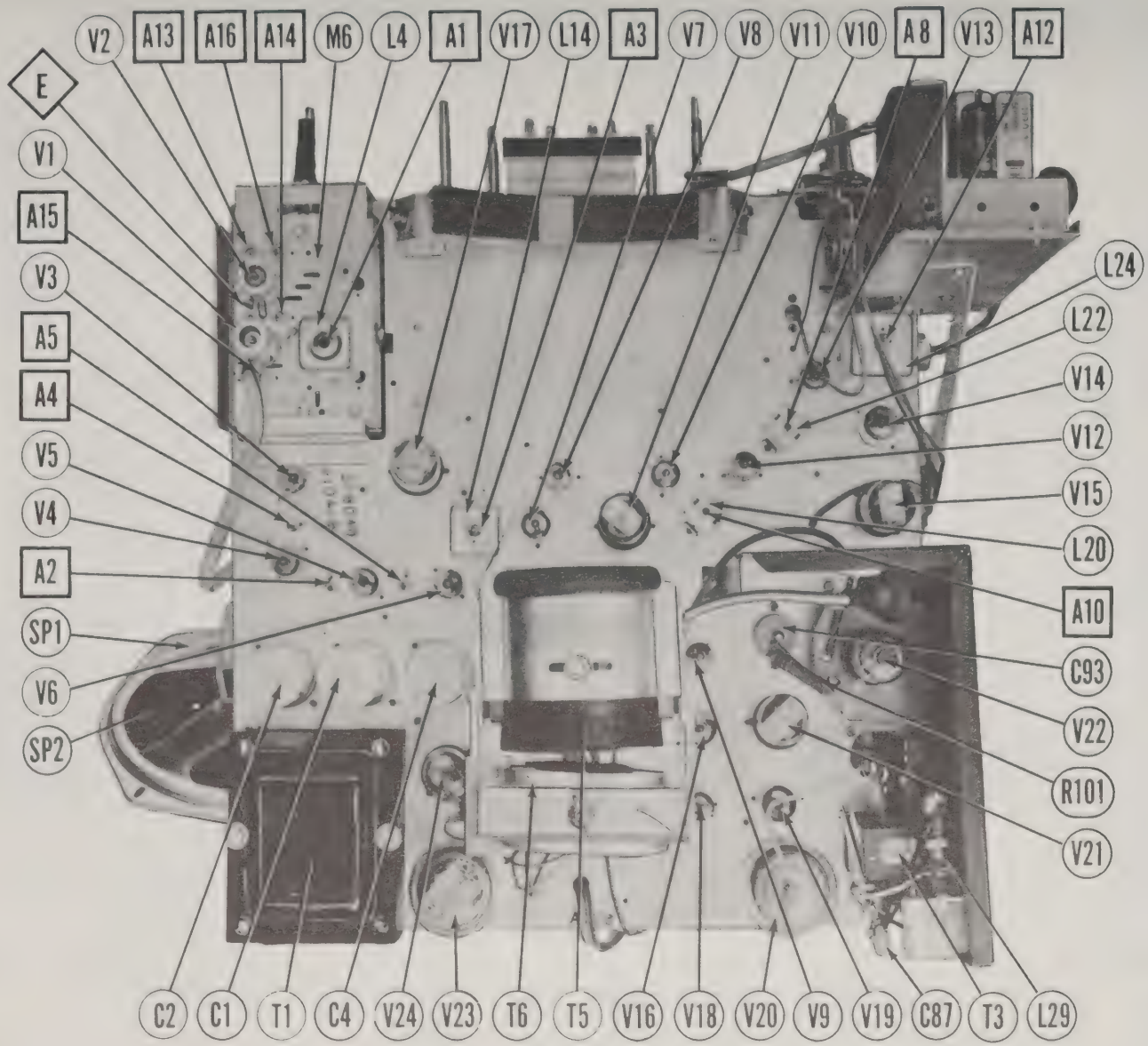



# TUBE PLACEMENT CHART




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION




CHASSIS TOP VIEW

# TV ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn the band switch to TV position (fully counter-clockwise).
To eliminate the high voltage shock hazard remove the yellow and green lead from L28.

## VIDEO IF ALIGNMENT

Connect the negative terminal of a 1 1/2 volt battery to the junction of R18 and R24 and the positive terminal to chassis.
Remove the converter tube from its socket and replace with a 6J6 with pin 1 removed to prevent erroneous indications.
Before aligning the IF stages, trap coil L7 must be detuned, by compressing the windings so they are closely spaced to prevent the IF system to become regenerative thereby preventing alignment.
NOTE: These receivers use either a Sarkes Tarzian tuner or a Standard Coil tuner and the alignment frequencies of the 1st, 3rd and 5th IF transformer vary slightly depending upon which tuner is being used. The frequencies to be used with the Sarkes Tarzian tuner are designated by an "asterisk" (*) and the frequencies for the Standard Coil tuner are designated by a dagger (†).

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 26.1MC † (Unmod.)<br>26.6MC * (Unmod.) | Any | DC Probe to Point (A). Common to chassis. | A1, A2 | Adjust for maximum deflection. |
| 2. | Direct | " | 25MC † (Unmod.)<br>24.75MC * (Unmod.) | " | " | A3 | " |
| 3. | Direct | " | 23.5MC (Unmod.) | " | " | A4, A5 | " |
| 4. | Direct | " | 22.4MC | " | " | A6 | Adjust by expanding and compressing coil turns for MINIMUM deflection. |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Construct a filter for the oscilloscope vertical amplifier input consisting of a 10KΩ resistor in series with the vertical amplifier input lead and a .001 MFD capacitor across the vertical amplifier terminals.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 25MC (10MC SWP) | 26.75MC | Any | Vert. Amp. thru 10KΩ to Point (A). Low side to chassis. | | Check for response curve similar to figure 1. The 26.75MC marker should be at 35% of response. If necessary retouch A1 thru A5 for proper response. |
| 6. | Direct | " | 22.25MC | " | " | " | | Check to see if 22.25MC marker appears in "notch" as per figure 1. If not, readjust A6 by expanding or compressing coil turns for proper response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to pin 1 (Cath.) of 6AL5 (V7). Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe to Point (B). Common to chassis. | A7, A8, A9, A10, A11 | Adjust for maximum deflection. |
| 8. | .01MFD | " | " | " | DC Probe to Point (C). Common to Point (D). | A12 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | .01MFD | High side to pin 1 (Cath.) of 6AL5 (V7). Low side to chassis. | 4.5MC (450KC Sweep) | 4.5MC | Any | Vert. Amp. to Point (B). Low side to chassis. | A7, A8, A9, A10, A11 | Disconnect stabilizer capacitor C5. Adjust for maximum amplitude and symmetry as per figure 2. |
| 8. | .01MFD | " | " | " | " | Vert. Amp. to Point (C). Low side to chassis. | A12 | Reconnect capacitor C5. Adjust A12 to place 4.5MC at center of crossover lines as per figure 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines. |

## OSCILLATOR AND RF ADJUSTMENTS

This receiver uses one of two tuners. Determine which tuner is in the set and use the alignment instructions for that tuner.

## RF AND MIXER ALIGNMENT (STANDARD COIL TUNER)

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 207MC (10MC SWP) | 205.25MC<br>209.75MC | 12 | Vert. Amp. thru 10KΩ to Point (E). Low side to chassis. | A13, A14, A15 | Adjust for response curve similar to figure 4 with markers above 80%. |
| 10. | " | " | 213MC (10MC SWP) | 211.25MC<br>215.75MC | 13 | " | | Check all channels for response curve similar to figure 4. If markers fall below 70% on any channel make slight adjustment of A13, A14 and A15 with channel selector set for that channel. Recheck all channels to see that they have not been seriously effected. |
| | | | 201MC (10MC SWP) | 199.25MC<br>203.75MC | 11 | | | |
| | | | 195MC (10MC SWP) | 193.25MC<br>197.75MC | 10 | | | |
| | | | 189MC (10MC SWP) | 187.25MC<br>191.75MC | 9 | | | |
| | | | 183MC (10MC SWP) | 181.25MC<br>185.75MC | 8 | | | |
| | | | 177MC (10MC SWP) | 175.25MC<br>179.75MC | 7 | | | |
| | | | 85MC (10MC SWP) | 83.25MC<br>87.75MC | 6 | | | |
| | | | 79MC (10MC SWP) | 77.25MC<br>81.75MC | 5 | | | |
| | | | 69MC (10MC SWP) | 67.25MC<br>71.75MC | 4 | | | |
| | | | 63MC (10MC SWP) | 61.25MC<br>65.75MC | 3 | | | |
| | | | 57MC (10MC SWP) | 55.25MC<br>59.75MC | 2 | | | |

# TV ALIGNMENT INSTRUCTIONS (CONT.)

## OSCILLATOR ALIGNMENT (STANDARD COIL TUNER)

Remove the dummy converter tube and replace the original 6J6 in its socket.
Set the fine tuning control to the mid-position of its range.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A16.
It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A16 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the indivdual channel oscillator adjustment for each channel that is off frequency. The individual channel oscillator adjustments are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 213MC (10MC SWP) | 211.25MC 215.75MC | 13 | Vert. Amp. thru 10KΩ to Point (A). Low side to chassis. | A17 | Adjust to place sound marker in "notch" as shown in figure 5. Video marker should be at 50% response. |
| | | | 207MC (10MC SWP) | 205.25MC 209.75MC | 12 | | A18 | |
| | | | 201MC (10MC SWP) | 199.25MC 203.75MC | 11 | | A19 | |
| | | | 195MC (10MC SWP) | 193.25MC 197.75MC | 10 | | A20 | |
| | | | 189MC (10MC SWP) | 187.25MC 191.75MC | 9 | | A21 | |
| | | | 183MC (10MC SWP) | 181.25MC 185.75MC | 8 | | A22 | |
| | | | 177MC (10MC SWP) | 175.25MC 179.75MC | 7 | | A23 | |
| | | | 85MC (10MC SWP) | 83.25MC 87.75MC | 6 | | A24 | |
| | | | 79MC (10MC SWP) | 77.25MC 81.75MC | 5 | | A25 | |
| | | | 69MC (10MC SWP) | 67.25MC 71.75MC | 4 | | A26 | |
| | | | 63MC (10MC SWP) | 61.25MC 65.75MC | 3 | | A27 | |
| | | | 57MC (10MC SWP) | 55.25MC 59.75MC | 2 | | A28 | |

## OSCILLATOR ALIGNMENT (SARKES-TARZIAN TUNER)

Remove dummy converter tube and replace original 6J6 in its socket.
Set the fine tuning control to the mid-position of its range.
The RF and mixer portions of this tuner are pre-set at the factory and should not required adjustment in the field.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 213MC (10MC SWP) | 211.25MC 215.75MC | 13 | Vert. Amp. thru 10KΩ to Point (A). Low side to chassis. | A29 | Adjust A29 to place sound marker in "notch" as shown in figure 5. Video marker should be at 50% response. |
| 13. | " | " | 207MC (10MC SWP) | 205.25MC 209.75MC | 12 | " | | Check to see if sound marker is in place well within tuning range of fine tuning range of fine tuning control. If not, a compromise adjustment of A29 will be required. |
| | | | 201MC (10MC SWP) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC SWP) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC SWP) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC SWP) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC SWP) | 175.25MC 179.75MC | 7 | | | |
| 14. | " | " | 85MC (10MC SWP) | 83.25MC 87.75MC | 6 | " | A30 | Adjust A30 to place sound marker in "notch" as shown in figure 5. Video marker should be at 50% response. |
| 15. | " | " | 79MC (10MC SWP) | 77.25MC 81.75MC | 5 | " | | Check to see if sound marker is in place well within tuning range of fine tuning control. If not, a compromise adjustment of A30 will be required. |
| | | | 69MC (10MC SWP) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC SWP) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC SWP) | 55.25MC 59.75MC | 2 | | | |

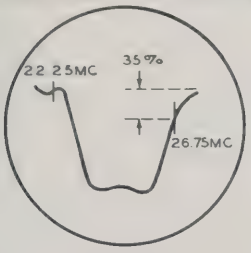


FIG.1

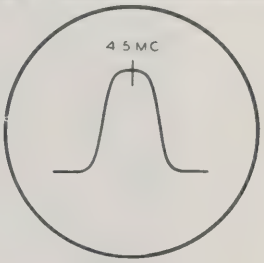


FIG. 2

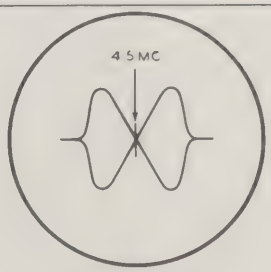


FIG. 3

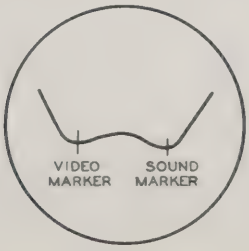


FIG.4

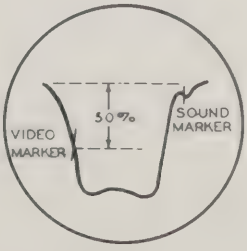


FIG.5

# RADIO ALIGNMENT INSTRUCTIONS

## AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 16 | .01MFD | High side to pin 7 (Grid) of 6BE6 (V27). Low side to chassis. | 455KC (400 ∿ Mod.) | AM 2nd position clock-wise | Tuning gang fully open | Across voice coil | A31, A32, A33, A34 | Adjust for maximum output. |
| 17 | .01MFD | " | 1620KC | " | " | " | A35 | " |
| 18 | | Loop | 1400KC | " | Tune for max. output | " | A36 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |

## FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 19 | .01MFD | High side to pin 7 (Grid) of 12AT7 (V26). Low side to chassis. | 10.7MC (Unmod.) | FM (fully clock-wise) | Tuning gang fully open | DC Probe to Point (F). Common to chassis. | A37, A38, A39, A40, A41 | Adjust for maximum deflection. |
| 20 | .01MFD | " | " | " | " | DC Probe to Point (G). Common to Point (H). | A42 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 19 | .01MFD | High side to pin 7 (Grid) of 12AT7 (V26). Low side to chassis. | 10.7MC (450KC Sweep) | FM (fully clock-wise) | Tuning gang fully open | Vert. Amp. to Point (F). Low side to chassis. | A37, A38, A39, A40, A41 | Disconnect stabilizer capacitor C98. Adjust for maximum amplitude and symmetry as per figure 6. |
| 20 | .01MFD | " | " | " | " | Vert. Amp. to Point (G). Low side to chassis. | A42 | Reconnect capacitor C98. Adjust A42 to place 10.7MC at center of crossover lines as per figure 7. SLIGHTLY retouch A37 for maximum amplitude and straightness of crossover lines. |

## FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 21 | 270Ω carbon res. | High side thru 270Ω to antenna terminal. Low side to chassis. | 108.5MC (Unmod.) | FM (fully clock-wise) | Tuning gang fully open | DC Probe to Point (G). Low side to chassis. | A43 | Adjust for maximum deflection. |
| 22 | " | " | 105MC | " | 105MC | " | A44 | " |

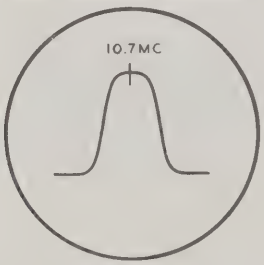



FIG. 6

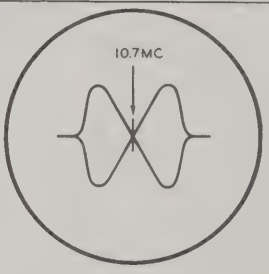



FIG. 7

# VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | -.4VDC | 0V. | 6.3VAC | 0V. | 125VDC | 125VDC | 0V. | | |
| V 2 | 6J6 | 75VDC | 70VDC | 6.3VAC | 0V. | -.1VDC | §-3VDC | 0V. | | |
| V 3 | 6AU6 | -.2VDC | 0V. | 6.3VAC | 0V. | 110VDC | 110VDC | .7VDC | | |
| V 4 | 6AU6 | -.2VDC | 0V. | 6.3VAC | 0V. | 110VDC | 110VDC | .7VDC | | |
| V 5 | 6AU6 | -.2VDC | 0V. | 6.3VAC | 0V. | 110VDC | 110VDC | .7VDC | | |
| V 6 | 6AU6 | 0V. | 0V. | 6.3VAC | 0V. | 110VDC | 110VDC | .6VDC | | |
| V 7 | 6AL5 | 0V. | 0V. | 6.3VAC | 0V. | .6VDC | 0V. | -.7VDC | | |
| V 8 | 6AU6 | -.7VDC | 0V. | 6.3VAC | 0V. | 90VDC | 60VDC | 0V. | | |
| V 9 | 6AU6 | ♦-32VDC | ♦0V. | 6.3VAC | 0V. | ♦-115VDC | ♦150VDC | ♦0V. | | |
| V 10 | 6C4 | 270VDC | 0V. | 0V. | 6.3VAC | 270VDC | 15VDC | 130VDC | | |
| V 11 | 6K6GT | 0V. | 0V. | 310VDC | 120VDC | 2.8VDC | 0V. | 6.3VAC | 43VDC | |
| V 12 | 6AU6 | ♦.2VDC | ♦.2VDC | 6.3VAC | 0V. | ♦140VDC | ♦140VDC | ♦1VDC | | |
| V 13 | 6AU6 | ♦0V. | ♦0V. | 6.3VAC | 0V. | ♦140VDC | ♦140VDC | ♦1VDC | | |
| V 14 | 6T8 | -.4VDC | -1.7VDC | -.4VDC | 0V. | 6.3VAC | -.5VDC | 0V. | -.7VDC | 75VDC |
| V 15 | 6V6GT | 0V. | 6.3VAC | 260VDC | 250VDC | 0V. | 270VDC | 0V. | 12VDC | |
| V 16 | 12AU7 | 17VDC | -5VDC | 0V. | 0V. | 0V. | 95VDC | 17VDC | 19VDC | 6.3VAC |
| V 17 | 6SN7GT | -.5VDC | 300VDC | 6.6VDC | -9.6VDC | 105VDC | 0V. | 0V. | 6.3VAC | |
| V 18 | 6AL5 | 0V. | 0V. | 0V. | 6.3VAC | 6.2VDC | 0V. | -4.4VDC | | |
| V 19 | 12AU7 | 130VDC | -5.4VDC | 60VDC | 0V. | 0V. | 270VDC | .1VDC | 60VDC | 6.3VAC |
| V 20 | 6BG6G | 0V. | 0V. | 6.7VDC | 0V. | -2VDC | -2.6VDC | 6.3VAC | 240VDC | TOP CAP * |
| V 21 | 6W4GT | -12VDC | 0V. | 440VDC | 0V. | 350VDC | 0V. | 6.3VAC | 0V. | |
| V 22 | 1B3GT | * DO NOT MEASURE. | | | | | | | | |
| V 23 | 5U4G | 360VDC | 360VDC | 0V. | 360VAC | 6.3VAC | 360VAC | 0V. | 360VDC | |
| V 24 | 6X5GT | 0V. | 6.3VAC | 170VAC | 350VDC | 170VAC | 0V. | 0V. | 170VDC | |
| V 25 | 12LP4 | 0V. | .1VDC | PIN 10 350VDC | PIN 11 120VDC | PIN 12 6.3VAC | | | | |

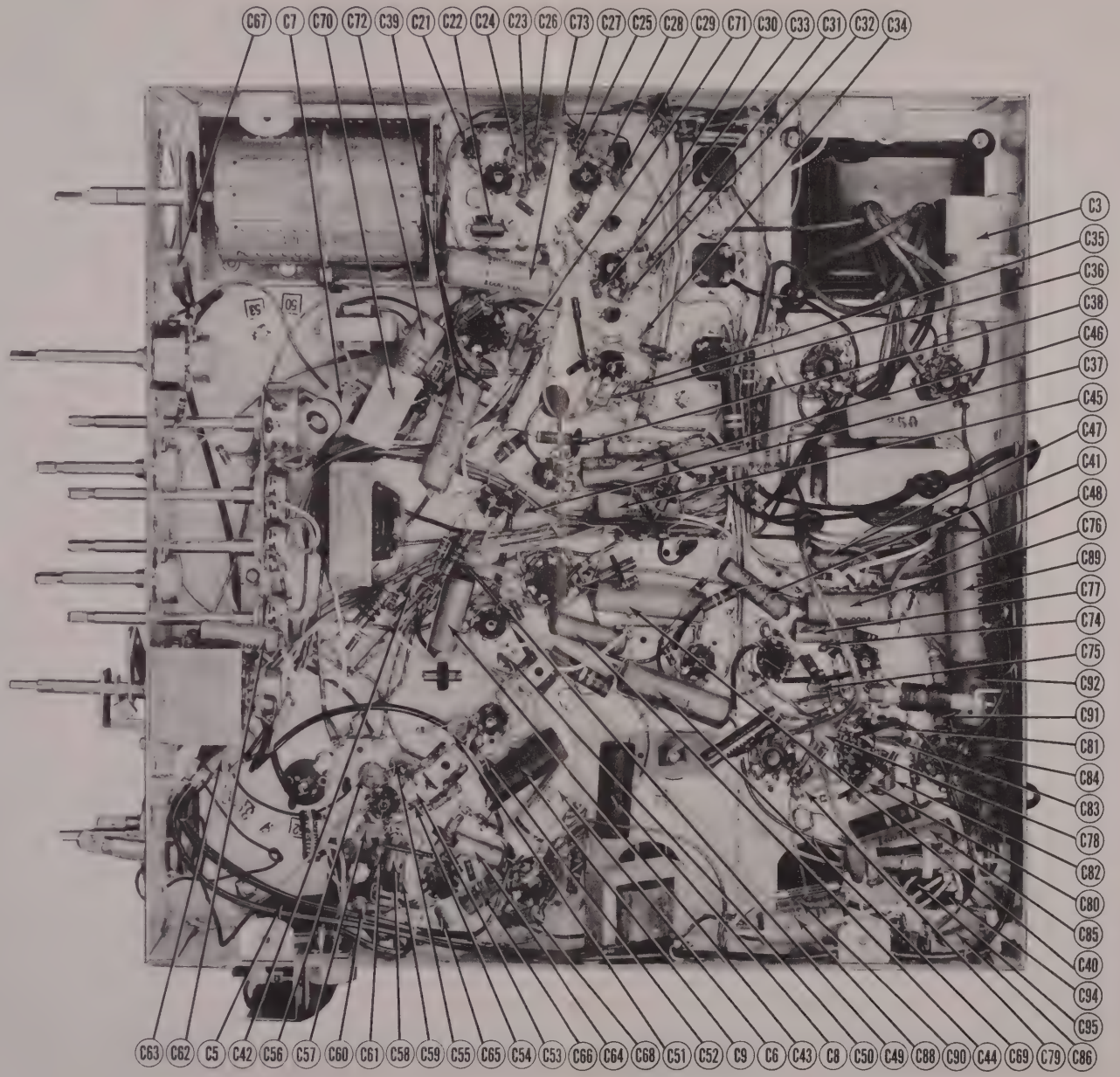
FUNCTION SELECTOR SWITCH IN "TV" POSITION.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
♦ MEASURED FROM JUNCTION OF R57 AND L22.

RESISTANCE READINGS

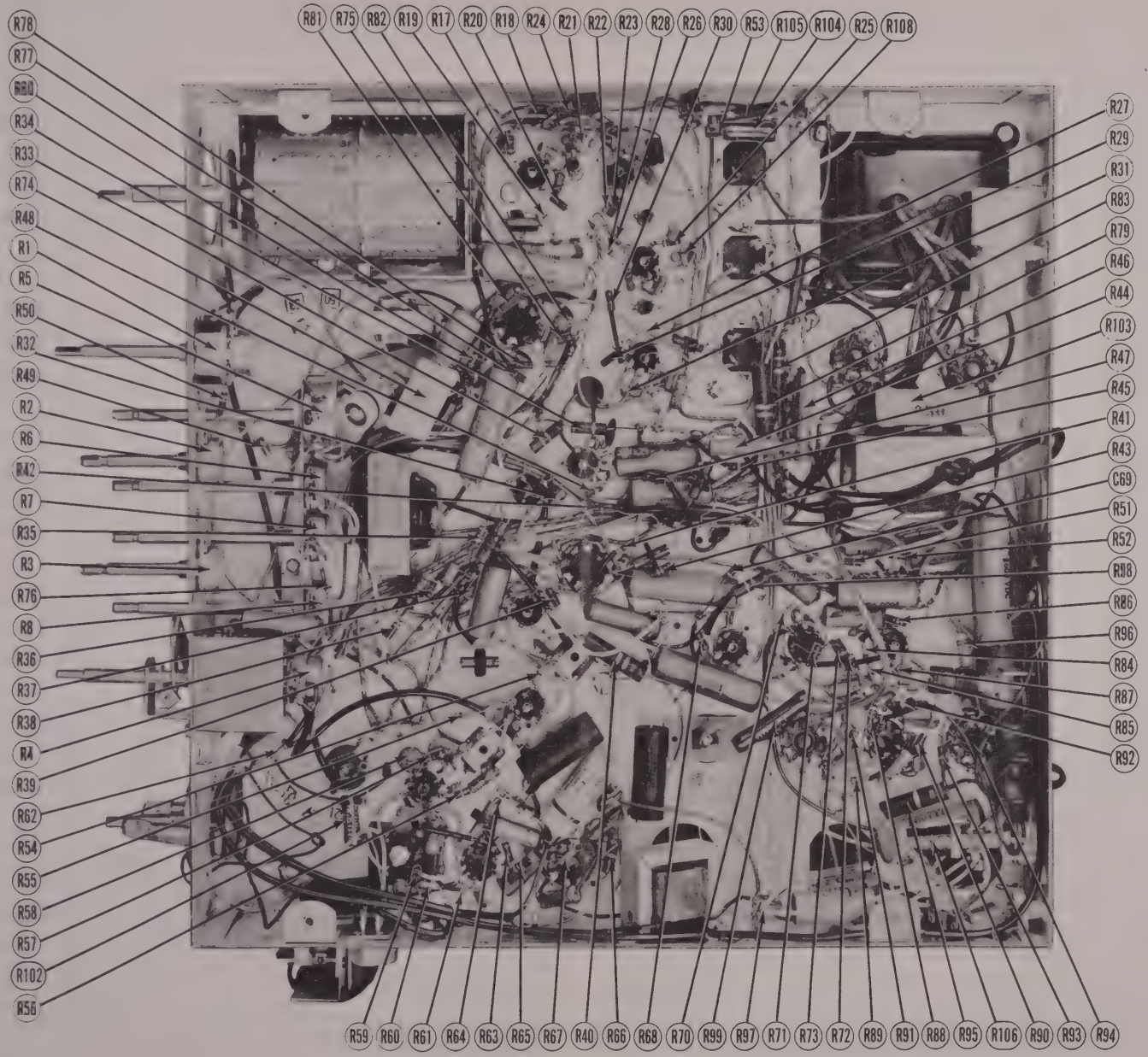
| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | 147KΩ | 0Ω | .1Ω | 0Ω | ♦2.2KΩ | ♦2.2KΩ | 0Ω | | |
| V 2 | 6J6 | ♦4.7KΩ | ♦15KΩ | .1Ω | 0Ω | 225KΩ | 10KΩ | 0Ω | | |
| V 3 | 6AU6 | 118KΩ | 0Ω | .1Ω | 0Ω | #2KΩ | #2KΩ | 82Ω | | |
| V 4 | 6AU6 | 119KΩ | 0Ω | .1Ω | 0Ω | #2KΩ | #2KΩ | 82Ω | | |
| V 5 | 6AU6 | 116KΩ | 0Ω | .1Ω | 0Ω | #2KΩ | #2KΩ | 82Ω | | |
| V 6 | 6AU6 | 2.8Ω | 0Ω | .1Ω | 0Ω | #2KΩ | #2KΩ | 68Ω | | |
| V 7 | 6AL5 | 2.5Ω | 0Ω | 1Ω | 0Ω | 100KΩ | 0Ω | 6.8KΩ | | |
| V 8 | 6AU6 | 6.8KΩ | 0Ω | .1Ω | 0Ω | #11KΩ | #9KΩ | 0Ω | | |
| V 9 | 6AU6 | #44KΩ | #950Ω | .1Ω | 0Ω | 100KΩ | †900Ω | #950Ω | | |
| V 10 | 6C4 | †900Ω | Inf. | 0Ω | .1Ω | †900Ω | 1 Meg. | 12KΩ | | |
| V 11 | 6K6GT | Inf. | 0Ω | †3KΩ | #950Ω | 1 Meg. | Inf. | .1Ω | 3.2KΩ | |
| V 12 | 6AU6 | ♦19Ω | ♦17Ω | 1Ω | 0Ω | †2KΩ | †2KΩ | ♦100Ω | | |
| V 13 | 6AU6 | ♦470KΩ | ♦0Ω | 1Ω | 0Ω | †2KΩ | †2KΩ | ♦82Ω | | |
| V 14 | 6T8 | Inf. | 36KΩ | Inf. | 0Ω | .1Ω | 33KΩ | 0Ω | 10 Meg. | †478KΩ |
| V 15 | 6V6GT | Inf. | .1Ω | †1.5KΩ | †9KΩ | 500KΩ | †900Ω | 0Ω | 330Ω | |
| V 16 | 12AU7 | #330KΩ | 270KΩ | 0Ω | 0Ω | 0Ω | #3.6KΩ | #330KΩ | 1.8KΩ | .1Ω |
| V 17 | 6SN7GT | 2.2Meg. | †4KΩ | 560Ω | 1.1 Meg. | †1.3 Meg. | 0Ω | 0Ω | .1Ω | |
| V 18 | 6AL5 | 27KΩ | 27KΩ | 0Ω | .1Ω | 4.8 Meg. | 0Ω | 4.8 Meg. | | |
| V 19 | 12AU7 | †305KΩ | 200KΩ | 1.5KΩ | 0Ω | 0Ω | †43KΩ | 5 Meg. | 1.5KΩ | .1Ω |
| V 20 | 6BG6G | Inf. | 0Ω | 82Ω | Inf. | 1 Meg. | 1 Meg. | .1Ω | †5.6KΩ | TOP CAP †15KΩ |
| V 21 | 6W4GT | 50KΩ | Inf. | †15KΩ | Inf. | †25Ω | Inf. | .1Ω | 0Ω | |
| V 22 | 1B3GT | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP †15KΩ |
| V 23 | 5U4G | 50KΩ | 50KΩ | Inf. | 42Ω | .1Ω | 42Ω | Inf. | 50KΩ | |
| V 24 | 6X5GT | Inf. | .1Ω | 22Ω | 50KΩ | 22Ω | Inf. | 0Ω | 50KΩ | |
| V 25 | 12LP4 | 0Ω | 1.1 Meg. | PIN 10 †10Ω | PIN 11 80KΩ | PIN 12 .1Ω | | | | |

FUNCTION SELECTOR SWITCH IN "TV" POSITION.
† MEASURED FROM PIN 8 OF V23.
# MEASURED FROM PIN 8 OF V24.
♦ MEASURED FROM JUNCTION OF R57 AND L22.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.




CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | EMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| | | STEW. WARN. PART No. | STANDARD REPLACEMENT | | |
| V1 | RF Amp. | 6AG5 | 6AG5 | 7BD | |
| V2 | Converter | 6J6 | 6J6 | 7BF | |
| V3 | 1st Video IF | 6AU6 | 6AU6 | 7BK | |
| V4 | 2nd Video IF | 6AU6 | 6AU6 | 7BK | |
| V5 | 3rd Video IF | 6AU6 | 6AU6 | 7BK | |
| V6 | 4th Video IF | 6AU6 | 6AU6 | 7BK | |
| V7 | Video Det. -DC Rest. | 6AL5 | 6AL5 | 6BT | |
| V8 | Video Amp. | 6AU6 | 6AU6 | 7BK | |
| V9 | AGC Keying | 6AU6 | 6AU6 | 7BK | |
| V10 | Cathode Follower | 6C4 | 6C4 | 6BG | |
| V11 | Video Output | 6K6GT | 6K6GT | 7S | |
| V12 | 1st Sound IF | 6AU6 | 6AU6 | 7BK | |
| V13 | 2nd Sound IF | 6AU6 | 6AU6 | 7BK | |
| V14 | Ratio Det. -AF Amp. | 6T8 | 6T8 | 9E | |
| V15 | Audio Output | 6V6GT | 6V6GT | 7AC | |
| V16 | Sync. Clipper-Sync. Phase Inv. | 12AU7 | 12AU7 | 9A | |
| V17 | Vert. Osc. -Vert. Amp. | 6SN7GT | 6SN7GT | 8BD | |
| V18 | Hor. AFC | 6AL5 | 6AL5 | 6BT | |
| V19 | Hor. Mult. | 12AU7 | 12AU7 | 9A | |
| V20 | Hor. Output | 6BG6G | 6BG6G | 5BT | |
| V21 | Damper | 6W4GT | 6W4GT | 4CG | |
| V22 | HV Rect. | 1B3GT | 1B3GT | 3C | |
| V23 | LV Rect. | 5U4G | 5U4G | 5T | |
| V24 | LV Rect. | 6X5GT | 6X5GT | 6S | |
| V25 | Picture Tube | 12LP4 | 12LP4 | 12D | |
| V26 | FM RF Amp. -FM Mixer | 12AT7 | 12AT7 | 9A | Used in models 9104-A, 9104-B, 9104-C only. |
| V27 | AM Conv. -FM Osc. | 6BE6 | 6BE6 | 7CH | Used in models 9104-A, 9104-B, 9104-C only. |
| V28 | 1st FM IF Amp. -AM IF Amp. | 6BA6 | 6BA6 | 7BK | Used in models 9104-A, 9104-B, 9104-C only. |
| V29 | 2nd FM IF Amp. -DET-AVC | 6BA6 | 6BA6 | 7BK | Used in models 9104-A, 9104-B, 9104-C only. |
| V30 | Ratio Det. | 6AL5 | 6AL5 | 6BT | Used in models 9104-A, 9104-B, 9104-C only. |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | STEW. WARN. PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | |
| C1A | 40 | 450 | 508072 | AFH888J | | UP44445 | | TVL-3787 | ▲ Filter |
| B | 40 | 450 | | | | | | | ■ Filter |
| C | 40 | 450 | | | | | | | ▲ Filter |
| C2A | 60 | 300 | 508073 | AFH1242G | | UP6245 | | TVL-2579 | ▲ Filter |
| B | 20 | 300 | | | | | | | ■ Filter |
| C3 | 40 | 300 | 160095 | PRS450/40 | | BR4035 | | TVA-1611 | Filter * |
| C4A | 20 | 450 | 508074 | AFH2222J | | UP7DJ1115 | | TVL-4760 | Decoupling |
| B | 10 | 450 | | PRS25/100 | | | | TVA-1207 | Vert. Output Decoup. |
| C | 10 | 450 | | | | | | | Vert. Osc. Decoup. |
| D | 100 | 25 | | | | | | | Vert. Output Cath. |
| C5 | 4 | 150 | 502547 | PRS150/4 | | BR415 | | TVA-1402 | Stabilizing Cap. |
| C6 | 4 | 450 | 504719 | PRS450/4 | | BR445 | | TVA-1702 | Decoupling |
| C7 | 4 | 450 | 504719 | PRS450/4 | | BR445 | | TVA-1702 | Decoupling |
| C8 | 50 | 25 | 502527 | PRS25/50 | | BR502A | | TVA-1206 | Output Cathode |
| C9 | 10 | 150 | 505174 | PRS150/10 | | BR1015 | | TVA-1406 | Dynamic Limiter Cap. |
| C10 | 5 | | 513432 | SI5DNPO | D2-4.7 | | NPOK-5 | | Fixed Trimmer † |
| C11 | .5-3 | | 507968 | | 829-3 | | | | Variable Trimmer |
| C12 | .5-3 | | 507968 | | 829-3 | | | | Variable Trimmer |
| C13 | 120 | | 513439 | GP120K | DN-120 | | GP2K-120 | | RF Decoup. |
| C14 | 1000 | | 513009 | GP1000M | D6-102 | | GP2L-001 | | RF Fil. Bypass |
| C15 | 100 | | 513440 | SI100KN750 | DN-100 | | N750L-100 | | RF Coupling |
| C16 | .5-3 | | 507968 | | 829-3 | | | | Variable Trimmer |
| C17 | 20 | | 513441 | SI20KNPO | D2-20 | | NPOK-20 | | Osc. Grid Cap. |
| C18 | 10 | | 513442 | SI10DN750 | DN-10 | | N750K-10 | | Fixed Trimmer |
| C19 | .5-3 | | 507968 | | 829-3 | | | | Variable Trimmer |
| C20A | 1000 | | 513009 | GP1000M | D6-102 | | 882-2 x 0015 | 29C1 | RF Bypass |
| B | 1000 | | 513009 | GP1000M | D6-102 | | | | Conv. Fil. Bypass |
| C21 | 1000 | | 513009 | GP1000M | D6-102 | | GP2L-001 | | AGC Filter |
| C22 | 240 | 500 | 512532 | 1469-00025 | D2-240 | 5R5T25 | | MS-325 | Fixed Trimmer |
| C23 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 1st V. IF Decoupling |
| C24 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 1st V. IF Fil. Bypass |
| C25 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | IF Coupling ‡ |
| C26 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | AGC Filter |
| C27 | 220 | | 513018 | GP220M | D6-221 | 5W5T25 | GP2K-220 | 1FM-325 | Fil. Bypass |
| C28 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 2nd V. IF Fil. Bypass |
| C29 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 2nd V. IF Decoup. |
| C30 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | IF Coupling ‡ |
| C31 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | AGC Filter |
| C32 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 3rd V. IF Fil. Bypass |
| C33 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 3rd V. IF Decoup. |
| C34 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | IF Coupling ‡ |
| C35 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 4th V. IF Fil. Bypass |
| C36 | 1000 | | 513009 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 4th V. IF Decoup. |
| C37 | 5 | | 513432 | GP5K | D2-4.7 | 5W5V5 | GP1K-5 | MS-55 | Video Diode Filter |
| C38 | 5000 | | 513013 | BPD-10 | D6-502 | 1D5D5 | 811-005 | 29C1 | Video Det. Fil. Byp. |
| C39 | .25 | 200 | 512045 | P488-25 | | | | TC-2 | V. Amp. Screen Byp. |
| C40 | .25 | 200 | 512045 | P488-25 | | | | TC-2 | AGC Filter |
| C41 | .05 | 200 | 512047 | P288-05 | | | | TM-15 | AGC Filter |
| C42 | 100 | | 513003 | GP100M | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Peaking |
| C43 | .1 | 200 | 512033 | P288-1 | | | | TM-1 | Video Coupling |
| C44 | .05 | 200 | 512027 | P288-05 | | | | TM-15 | Video Coupling |
| C45 | .05 | 600 | 512031 | P688-05 | | | | TM-15 | Video Coupling |
| C46 | .05 | 600 | 512031 | P688-05 | | | | TM-15 | Video Coupling |
| C47 | .05 | 600 | 512031 | P688-05 | | | | TM-15 | Integrator Net. |
| C48 | .02 | 200 | 512019 | P488-02 | | | | TM-12 | Vert. Sweep Coup. |
| C49 | 2.2 | | 513001 | | D2-2.2 | | | | Sound IF Coup. |
| C50 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st Sound IF Decoup. |

## CAPACITORS (CONT.)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA STEW. WARN. PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C51 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st Sound IF Decoup. |
| C52 | 1000 | | 513008 | GP1000M | D6-102 | 1WD1 | GP2L-001 | 1FM-21 | 1st Sound IF Fil. Byp. |
| C53 | 47 | | 513433 | GP47K | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Sound IF Coupling |
| C54 | 220 | | 513018 | GP220M | D6-221 | 5W5T25 | GP2K-320 | 1FM-325 | RF Bypass |
| C55 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | RF Bypass |
| C56 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd S. IF Decoup. |
| C57 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd S. IF Fil. Byp. |
| C58 | 220 | 500 | 513537 | 1468-00025 | D6-221 | 5W5T25 | GP2K-320 | 1FM-325 | Diode Load Cap. |
| C59 | 1500 | | 513010 | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | RF Bypass |
| C60 | 1500 | | 513010 | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | De-emphasis |
| C61 | 1000 | | 513009 | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | Sound IF Coupling |
| C62 | .05 | 200 | 512027 | P288-05 | | PTE4S5 | | TM-15 | Audio Coupling |
| C63 | .005 | 600 | 512007 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Tone Comp. |
| C64 | .005 | 600 | 512007 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Audio Coupling |
| C65 | 270 | | 513006 | GP270M | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | AF Amp. Plate Byp. |
| C66 | .005 | 600 | 512007 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Audio Coupling |
| C67 | .01 | 600 | 512013 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Tone Comp. |
| C68 | .002 | 600 | 512003 | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Output Plate Bypass |
| C69 | .25 | 200 | 512045 | P488-25 | | GT2P25 | | TC-2 | Sync. Coupling |
| C70A | 10000 | | ‡ | BPD-10 | D6-103 | PTE6S1 | 811-01 | TM-11 | Vert. Sync. Coup. |
| B | 2000 | | | GP2000M | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Integrator Net. |
| C | 5000 | | | BPD-5 | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| D | 5000 | | | BPD-5 | D6-502 | PTE6D5 | 811-005 | TM-25 | Integrator Net. |
| C71 | 4700 | 500 | 512533 | 1467-005 | D6-472 | 1D5D5 | GP2M-0047 | 1FM-25 | Vert. Osc. Grid |
| C72 | .1 | 600 | 512306 | P688-1 | | PTE6P1 | | TM-1 | Vert. Disch. |
| C73 | .1 | 600 | 512037 | P688-1 | | PTE6P1 | | TM-1 | Vert. Sweep Coup. |
| C74 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | Hor. Sync. Coup. |
| C75 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | Hor. Sync. Coup. |
| C76 | .05 | 600 | 512031 | P688-05 | | PTE6S5 | | TM-15 | Hor. Feedback |
| C77 | .01 | 600 | 512013 | P688-01 | D6-103 | PTE6S1 | 811-01 | TM-11 | Voltage Divider |
| C78 | 5000 | | 512013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AFC Filter |
| C79 | .05 | 200 | 512027 | P288-05 | | PTE4S5 | | TM-15 | AFC Filter |
| C80 | 330 | | 513007 | 1468-00035 | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | Hor. Mult. Feedback |
| C81 | 3300 | 500 | 512531 | | | | | | Fixed Trimmer |
| C82 | 390 | 500 | 512535 | 1465-3054 | D6-391 | 5R5T4 | GP2K-390 | MS-34 | Hor. Disch. |
| C83 | 270 | 500 | 512536 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Hor. Sweep Coupling |
| C84 | .05 | 600 | 512031 | P688-05 | | PTE6S5 | | TM-15 | Hor. Output Screen |
| C85 | .25 | 400 | 512047 | P488-25 | | GT4P25 | | TC-2 | Hor. Output Cath. |
| C86 | 10 | 1500 | 512537 | | | | | | Hor. Feedback |
| C87 | .02 | 600 | 512015 | P688-02 | | PTE6S2 | | TM-12 | Fixed Trimmer |
| C88 | .15 | 200 | 512039 | P288-15 | | | | | Damper Filter |
| C89 | .25 | 600 | 512049 | 684-25 | | GT6P25 | | TC-2 | Damper Filter |
| C90 | .05 | 200 | 512027 | P288-05 | | PTE4S5 | | TM-15 | Damper Filter |
| C91 | 47 | | 513002 | GP47M | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Hor. Output Fil. † |
| C92 | .25 | 600 | 512049 | 684-25 | | GT6P25 | | TC-2 | Hor. Sweep Coup. |
| C93 | 500 | 10000 | 513021 | HV-500 | TV1-501 | | | | HV Filter |
| C94 | .01 | 400 | 512255 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Line Filter |
| C95 | .01 | 400 | 512255 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Line Filter |
| C96 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | AGC Filter † |
| C97 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | 4th V. IF Cath. † |
| C98 | 3 | 50 | 507946 | PRS150/4 | | BBR4-50 | | TVA-1301 | Stabilizing Cap. |
| C99 | 10 | | 513023 | GP10M | D6-100 | 5W5Q1 | GP1K-10 | MS-41 | Ant. Coupling |
| C100 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | FM RF Grid Filter |
| C101 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | Mixer Fil. Bypass |
| C102 | 330 | | 513007 | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | RF Coupling |
| C103 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | RF Coupling |
| C104 | 1 | | 513000 | | D2-1 | | | | Osc. Coupling |
| C105 | 47 | | 513002 | GP47M | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Osc. Grid Cap. |
| C106 | 47 | | 513002 | GP47M | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | Osc. Grid Cap. |
| C107 | 2.5 | | 513436 | | | | | | Osc. Grid Byp. |
| C108 | 2 | | 513001 | | D2-2.2 | | | | Osc. Feedback |
| C109 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Decoupling |
| C110 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Decoupling |
| C111 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | AVC Filter |
| C112 | .05 | 400 | 512028 | P488-05 | | PTE4S5 | | TM-15 | AVC Filter |
| C113 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st IF Decoupling |
| C114A | 100 | | ¶ 506338 | GP100M | ¶ PC-50 | | GP1K-100 | 1FM-31 | Diode RF Filter |
| B | 100 | | | GP100M | | | GP1K-100 | 1FM-31 | Diode RF Filter |
| C115 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd IF Decoup. |
| C116 | 330 | | 513007 | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | Diode Load Cap. |
| C117 | 330 | | 513007 | GP330M | D6-331 | 5W5T3 | GP2K-330 | 1FM-335 | RF Bypass |
| C118 | .001 | 400 | 512103 | P688-001 | D6-102 | PTE6D1 | GP2L-001 | TM-21 | De-emphasis |
| C119 | 1000 | | 513009 | GP1000M | D6-102 | 1WSD1 | GP2L-001 | 1FM-21 | AM Conv. Fil. Byp. |
| C120 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 1st IF Fil. Byp. |
| C121 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | 2nd IF Fil. Byp. |
| C122 | 5000 | | 513013 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Ratio Det. Fil. Byp. |

* Used in models 9104-A, B and C only.
† Not used in all models.
‡ Some models use 82MMF in this application.
§ Items C70A, C70B, C70C, C70D, R74A, R74B, and R74C are combined into one unit obtainable under MFGR'S Part #508062.
¶ Items C114A, C114B, and R116 are combined into one unit

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA STEW. WARN. PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 3000Ω | 4 | 508201 | | | | Contrast control-front-Wire Wound |
| B | 500KΩ | ½ | | | | | Tone control-rear |
| R2A | 50KΩ | ½ | 508202 | QU-123 | AM-44-S | AN-31 | Brightness control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-4 | Attach to R2A per instructions |
| R3A | 50KΩ | ½ | 508202 | QU-123 | AM-44-S | AN-31 | Horiz. hold control |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | AK-4 | Attach to R3A per instructions |
| R4 | 1 Meg. | ½ | 508182 | | | | Volume control and switch |
| R5 | 5500Ω | 4 | 508057 | | | | Focus control |
| R6 | 2.5 Meg. | ½ | 508052 | QU-239, C3 * | | B-83, AK-16 † | Height control |
| R7 | 1 Meg. | ½ | 508051 | QU-137, C3 * | | B-69, AK-16 † | Vert hold control |
| R8A | 8000Ω | ½ | 508053 | | AM-23-S | AN-13 | Vert. linearity control |
| B | Shaft | | Not Req. | | KSS-5 | AK-4 | Attach to R8A per instructions |

* Use C-3 coupler and part of original shaft to obtain desired shaft length.
† Use AK-16 coupler and part of original shaft to obtain desired shaft length.

## RESISTORS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA STEW. WARN. PART No. | IRC PART No. | IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED |
|---|---|---|---|---|---|
| R9 | 3900Ω | ½ | 510147 | BTS-3900 | Antenna Coil Shunt |
| R10 | 47KΩ | ½ | 510187 | | AGC Network |
| R11 | 32000Ω | ½ | 510143 | BTS-2200 | RF Amp. Decoupling |
| R12 | 10KΩ | ½ | 510155 | | RF Amp. Plate Coil Shunt |
| R13 | 4700Ω | ½ | 510149 | BTS-4700 | Mixer Grid |
| R14 | 220KΩ | ½ | 510179 | | Mixer Grid |
| R15 | 10KΩ | ½ | 510155 | | Osc. Grid |
| R16 | 4700Ω | ½ | 510149 | BTS-4700 | Osc. Plate |
| R17 | 68000Ω | ½ | 510151 | | 1st Video IF Amp. Grid |
| R18 | 1000Ω | ½ | 510137 | BTS-1000 | AGC Network |
| R19 | 82Ω | ½ | 510117 | | 1st Video IF Amp. Cathode |
| R20 | 1000Ω | ½ | 510137 | BTS-1000 | 1st Video IF Amp. Decoupling |
| R21 | 82000Ω | ½ | 510153 | | 2nd Video IF Amp. Grid |
| R22 | 82Ω | ½ | 510117 | | 2nd Video IF Amp. Cathode |
| R23 | 1000Ω | ½ | 510137 | BTS-1000 | 2nd Video IF Amp. Decoupling |
| R24 | 1000Ω | ½ | 510137 | BTS-1000 | AGC Network |
| R25 | 4700Ω | ½ | 510149 | BTS-4700 | 3rd Video IF Amp. Grid |
| R26 | 82Ω | ½ | 510117 | | 3rd Video IF Amp. Cathode |
| R27 | 82000Ω | ½ | 510153 | | 3rd Video IF Amp. Coil Shunt |
| R28 | 1000Ω | ½ | 510137 | BTS-1000 | 3rd Video IF Amp. Decoupling |
| R29 | 68Ω | ½ | 510115 | | 4th Video IF Amp. Cathode |
| R30 | 1000Ω | ½ | 510137 | BTS-1000 | 4th Video IF Amp. Decoupling |
| R31 | 82000Ω | ½ | 510153 | | 4th Video IF Amp. Coil Shunt |
| R32 | 68000Ω | ½ | 510151 | BTS-6800 | Video Amp. Grid |
| R33 | 10KΩ | 1 | 510254 | BTA-10K | Voltage Divider |
| R34 | 8200Ω | 1 | 510253 | BTA-8200 | Video Amp. Screen |
| R35 | 47KΩ | ½ | 510166 | BTS-47K | Peaking Coil Shunt |
| R36 | 33KΩ | ½ | 510164 | BTS-33K | AGC Keying Grid |
| R37 | 56000Ω | ½ | 510150 | BTS-5600 | Peaking |
| R38 | 56000Ω | ½ | 510150 | BTS-5600 | Video Amp. Plate-See Note 1 |
| R39 | 1 Meg. | ½ | 510191 | BTS-1 Meg. | Cathode Follower Grid |
| R40 | 12KΩ | 2 | 510356 | BT-2-12K | Cathode Follower Cathode |
| R41 | 1 Meg. | ½ | 510191 | BTS-1 Meg. | Video Output Grid |
| R42 | 270Ω | ½ | 510126 | BW-½-270 | Video Output Cathode |
| R43 | 12KΩ 5% | ½ | 510723 | BTS-12K-5% | Peaking Coil Shunt |
| R44 | 1500Ω | 2 | 510339 | BT-2-1500 | Video Output Plate |
| R45 | 220KΩ 20% | ½ | 510179 | BTS-220K | Isolation-See Note 2 |
| R46 | 1500Ω | 2 | 510339 | BT-2-1500 | Video Output Plate |
| R47 | 1 Meg. 20% | ½ | 510191 | BTS-1 Meg. | Picture Tube Grid-See Note 3 |
| R48 | 100KΩ 20% | ½ | 510173 | BTS-100K | DC Rest. Load-See Note 4 · |
| R49 | 82KΩ | ½ | 510171 | BTS-82K | Voltage Divider |
| R50 | 15KΩ | ½ | 510157 | BTS-15K | Voltage Divider |
| R51 | 22KΩ 20% | ½ | 510161 | BTS-22K | Voltage Divider |
| R52 | 2200Ω 20% | ½ | 510143 | BTS-2200 | Blanking Network |
| R53 | 560Ω | 2 | 510332 | BT-2-560 | Focus Coil Shunt |
| R54 | 82Ω | ½ | 510117 | | 1st Sound IF Amp. Cathode |
| R55 | 1000Ω | ½ | 510137 | BTS-1000 | 1st Sound IF Amp. Decoupling |
| R56 | 470KΩ 20% | ½ | 510185 | | 2nd Sound IF Grid |
| R57 | 82Ω | ½ | 510117 | | 2nd Sound IF Cathode |
| R58 | 1000Ω | ½ | 510137 | BTS-1000 | 2nd Sound IF Decoupling |
| R59 | 22KΩ | ½ | 510160 | | De-emphasis |
| R60 | 18KΩ | ½ | 510159 | BTS-18K | Ratio Det. Diode Load |
| R61 | 18KΩ | ½ | 510159 | BTS-18K | Ratio Det. Diode Load |
| R62 | 68KΩ | ½ | 510170 | BTS-68K | Tone Compensation |
| R63 | 10 Meg. 20% | ½ | 510197 | BTS-10 Meg. | AF Amp. Grid |
| R64 | 33KΩ | ½ | 510163 | BTS-33K | Dyn. Limiter Load |
| R65 | 470KΩ 20% | ½ | 510185 | BTS-470K | AF Amp. Plate |
| R66 | 330Ω | 1 | 510227 | BTA-330 | Audio Output Cathode |
| R67 | 8200Ω | ½ | 510153 | BTS-8200 | Decoupling |
| R68 | 100KΩ 20% | ½ | 510173 | BTS-100K | AGC Keying Plate Load |
| R69 | 10KΩ 20% | ½ | 510155 | BTS-10K | AGC Filter |
| R70 | 270KΩ | ½ | 510180 | BTS-270K | Sync. Clipper Grid |
| R71 | 330KΩ | ½ | 510181 | BTS-330K | Sync. Clipper Plate |
| R72 | 1800Ω 5% | ½ | 510141 | BTS-1800-5% | Sync. Phase Inv. Cathode |
| R73 | 2700Ω | 1 | 510144 | BTA-2700 | Sync. Phase Inv. Plate |
| R74A | 22KΩ | ½ | | | Integrator |
| B | 8200Ω | ½ | § | | Integrator |
| C | 8200Ω | ½ | | | Integrator |
| R75 | 1 Meg. | ½ | 510190 | BTS-1 Meg. | Vert. Osc. Grid |
| R76 | 100KΩ | ½ | 510172 | BTS-100K | Voltage Divider |
| R77 | 6.8 Meg. | ½ | 510196 | BTS-6.8 Meg. | Voltage Divider |
| R78 | 1.5 Meg. | ½ | 510192 | BTS-1.5 Meg. | Vert. Osc. Plate |
| R79 | 56KΩ | 2 | 510168 | BT-2-56K | Decoupling |
| R80 | 3300Ω | ½ | 510145 | BTS-3300 | Vert. Peaking |
| R81 | 2.2 Meg. | ½ | 510193 | BTS-2.2 Meg. | Vert. Amp. Grid |
| R82 | 560Ω | ½ | 510132 | BTS-560 | Vert. Amp. Cathode |
| R83 | 27000Ω | 2 | 510244 | BT-2-2700 | Vert. Amp. Plate Decoupling |
| R84 | 100KΩ | ½ | 510172 | BTS-100K | Horiz. AFC Diode Load |
| R85 | 100KΩ | ½ | 510172 | BTS-100K | Horiz. AFC Diode Load |
| R86 | 27KΩ | ½ | 510162 | BTS-27K | Feedback |
| R87 | 4.7 Meg. 20% | ½ | 510195 | BTS-4.7 Meg. | Horiz. AFC Diode Load |
| R88 | 470KΩ 20% | ½ | 510185 | BTS-470K | Horiz. AFC Filter Network |
| R89 | 1500Ω | ½ | 510139 | BTS-1500 | Horiz. Mult. Cathode |
| R90 | 5600Ω | ½ | 510150 | BTS-5600 | Horiz. Mult. Plate |
| R91 | 150KΩ | ½ | 510175 | BTS-150K | Horiz. Mult. Grid |
| R92 | 270KΩ | ½ | 510180 | BTS-270K | Horiz. Mult. Plate |
| R93 | 68Ω | ½ | 510116 | | Parasitic Suppressor |
| R94 | 1 Meg. | ½ | 510191 | BTS-1 Meg. | Horiz. Output Grid |
| R95 | 82Ω | 2 | 510317 | BW-2-82 | Horiz. Output Cathode |
| R96 | 4700Ω | 1 | 510248 | BTA-4700 | Horiz. Output Screen Decoupling |
| R97 | 22KΩ 20% | 1 | 510281 | BTA-22K | Horiz. Mult. Decoupling |
| R98 | 10KΩ | 1 | 510154 | BTA-10K | Horiz. Feedback |
| R99 | 15KΩ | 10 | 510728 | AB-15K | Damper Diode Load-Wire Wound |
| R100 | 3.3Ω | ½ | 510725 | | HV Rect. Filament |
| R101 | 1 Meg. | 2 | 510391 | | HV Filter |
| R102 | 7500Ω | 5 | 510727 | AB-7500 | Filter-Wire Wound |
| R103 | 650Ω | 10 | 510733 | | Filter-Wire Wound |
| R104 | 850Ω | 5 | 510726 | | Filter-Wire Wound |
| R105 | 100Ω 20% | ½ | 510319 | | Surge Limiter-Wire Wound |
| R106 | 220KΩ 20% | ½ | 510179 | BTS-220K | Line Filter-See Note 5 |
| R107 | 2200Ω | ½ | 510543 | BTS-2200 | AGC Network-See Note 5 |
| R108 | 10000Ω 20% | ½ | 510837 | BTS-1000 | AGC Network |
| R109 | 100KΩ | ½ | 510173 | BTS-100K | FM RF Amp. Grid |
| R110 | 2.2 Meg. | ½ | 510193 | BTS-2.2 Meg. | FM Mixer Grid |
| R111 | 10KΩ | ½ | 510155 | BTS-10K | Osc. Grid |
| R112 | 4700Ω | 1 | 510249 | BTA-4700 | Decoupling |
| R113 | 6800Ω | ½ | 510152 | BTS-6800 | Decoupling |

## RESISTORS (CONT.)

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA STEW. WARN. PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R114 | 3300Ω | ½ | 510145 | BTS-3300 | 1st IF Amp. Decoupling |
| R115 | 3300Ω | 1 | 510246 | BTA-3300 | Decoupling |
| R116 | 47KΩ | ½ | ¶ | | Diode Filter |
| R117 | 470KΩ | ½ | 510185 | BTS-470K | Diode Load |
| R118 | 2.2 Meg. | ½ | 510193 | BTS-2.2 Meg. | AVC Network |
| R119 | 1500Ω | 1 | 510240 | BTA-1500 | 2nd FM IF Amp. Decoupling |
| R120 | 220Ω | ½ | 510125 | | Balancing |
| R121 | 18KΩ | ½ | 510159 | BTS-18K | De-emphasis |
| R122 | 10KΩ | ½ | 510155 | BTS-10K | Ratio Det. Diode Load |
| R123 | 10KΩ | ½ | 510155 | BTS-10K | Ratio Det. Diode Load |

§ Items R74A, R74B, R74C, C70A, C70B, C70C and C70D are combined into one unit obtainable under MFGR'S Part #508062.
Note 1. Some models use a 8200Ω resistor in this application.
Note 2. Some models use a 10KΩ resistor in this application.
Note 3. Some models use 100KΩ resistor in this application.
Note 4. Some models use a 1 Meg resistor in this application.
Note 5. Not used in all models.
¶ Items R116, C114A and C114B are combined into one unit - See C114 under capacitor listings for replacments.

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA STEW. WARN. PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. |
|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC ⓖ 1.9A | 640VCT .200ADC Tap ④ 320VCT .050ADC | 5VAC ⓖ 3A | 6.3VAC ⓖ 9.5A | 508060 | | P-3067 ④ | |

④ Add series resistor to reduce plate voltage.

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING DC RESISTANCE PRI. | RATING DC RESISTANCE SEC. | REPLACEMENT DATA STEW. WARN. PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| T2 | 170Ω | 950Ω | 508076 | A-8111 ① | A-3000 ① | TBO-1 ① | Vert. Block Osc. Trans. |
| T3 | 485Ω Tap ⓖ 170Ω | 10.1Ω Tap ⓖ .6Ω SEC. 2 0Ω | 508058 | A-8128 | HVO-3 | TFB-3 | Hor. Output Trans. |
| T4 | 1400Ω | 11Ω | 508059 | A-8112 | A-3036 | TSO-5 ① | Vert. Output Trans. |
| T5A | 14Ω | | 507791 | DY-7 | MD-3 | | Hor. Deflection Coil |
| B | 60Ω | | | | | | Vert. Deflection Coil |
| T6 | 1000Ω | | 508065 | | | | Focus Coil |

① Drill one new mounting hole.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING IMPEDANCE PRI. | RATING IMPEDANCE SEC. | RATING DC RES. PRI. | RATING DC RES. SEC. | REPLACEMENT DATA STEW. WARN. PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T7 | 7300Ω | 4.7Ω | 650Ω | .7Ω | 505912 | A-3823 | A-3019 | RO-13 | |

## SPEAKER

| ITEM No. | RATINGS FIELD RES. | RATINGS V. C. IMP. | REPLACEMENT DATA STEW. WARN. PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1A | PM | 4.7Ω | 508174 ② | " | 69A2 | ② Used in models 9104-B, 9104-C, 9103-C |
| B | PM | | 508157 ③ | | | ③ Used in models 9104-A, 9103-B |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2A | 9" x 6 1/8" | 9/16" | | | | |
| B | 6" | 9/16" | | | | |

## FILTER CHOKE

| ITEM No. | RATINGS TOTAL DIRECT CURRENT | RATINGS D. C. RESISTANCE | RATINGS INDUCTANCE (D CURRENT 1000 ↁ) | REPLACEMENT DATA STEW. WARN. PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| L1 | .200ADC | 10Ω | .5 Henries | 508341 | C-2325 ① | C-2991 | TR-4200 ① | ① Drill one new mounting hole. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA STEW. WARN. PART No. | MEISSNER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L2A | Ant. Coil | 0Ω | 0Ω | 507952 | | Channel 2 |
| B | Ant. Coil | 0Ω | 0Ω | 507953 | | Channel 3 |
| C | Ant. Coil | 0Ω | 0Ω | 507954 | | Channel 4 |
| D | Ant. Coil | 0Ω | 0Ω | 507955 | | Channel 5 |
| E | Ant. Coil | 0Ω | 0Ω | 507956 | | Channel 6 |
| F | Ant. Coil | 0Ω | 0Ω | 507957 | | Channel 7 |
| G | Ant. Coil | 0Ω | 0Ω | 507958 | | Channel 8 |
| H | Ant. Coil | 0Ω | 0Ω | 507959 | | Channel 9 |
| I | Ant. Coil | 0Ω | 0Ω | 507960 | | Channel 10 |
| J | Ant. Coil | 0Ω | 0Ω | 507961 | | Channel 11 |
| K | Ant. Coil | 0Ω | 0Ω | 507962 | | Channel 12 |
| L | Ant. Coil | 0Ω | 0Ω | 507963 | | Channel 13 |

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (RF-IF) CONT.

| ITEM No. | USE | DC RES. PRI. | DC RES. SEC. | REPLACEMENT DATA STEW. WARN. PART No. | REPLACEMENT DATA MEISSNER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L3A | RF-Osc. | 0Ω | | 507972 | | Channel 2 |
| B | RF-Osc. | 0Ω | | 507973 | | Channel 3 |
| C | RF-Osc. | 0Ω | | 507974 | | Channel 4 |
| D | RF-Osc. | 0Ω | | 507975 | | Channel 5 |
| E | RF-Osc. | 0Ω | | 507976 | | Channel 6 |
| F | RF-Osc. | 0Ω | | 507977 | | Channel 7 |
| G | RF-Osc. | 0Ω | | 507978 | | Channel 8 |
| H | RF-Osc. | 0Ω | | 507979 | | Channel 9 |
| I | RF-Osc. | 0Ω | | 507980 | | Channel 10 |
| J | RF-Osc. | 0Ω | | 507981 | | Channel 11 |
| K | RF-Osc. | 0Ω | | 507982 | | Channel 12 |
| L | RF-Osc. | 0Ω | | 507983 | | Channel 13 |
| L4 | 1st Video IF | .2Ω | | 507985 | | |
| L5 | Fil. Choke | 1Ω | | 507970 | | |
| L6 | Fil. Choke | 1Ω | | 507971 | | |
| L7 | IF Trap | 0Ω | | 507567 | | |
| L8 | 2nd Video IF | .2Ω | | 507343 | | Less slug , slug #507357 |
| L9 | Fil. Choke | 0Ω | | 507584 | | |
| L10 | 3rd Video IF | .2Ω | | 507343 | | Less slug, slug #507357 |
| L11 | 4th Video IF | .2Ω | | 507343 | | Less slug, slug #507357 |
| L12 | RF Choke | 2.8Ω | | 507367 | | |
| L13 | Fil. Choke | .2Ω | | 507587 | | |
| L14 | 5th Video IF | .2Ω | | 507591 | | Less slug, slug #507357 |
| L15 | Fil. Choke | .8Ω | | 507586 | | |
| L16 | Peaking | 26Ω | | 507374 | | |
| L17 | Peaking | 26Ω | | 507374 | | |
| L18 | Peaking | 4.9Ω | | 508069 | | |
| L19 | Peaking | 5.9Ω | | 508070 | | |
| L20 | 1st Sound IF | 2.2Ω | 2.2Ω | 508061 | | |
| L21 | RF Choke | 17Ω | | 507373 | | |
| L22 | 2nd Sound IF | 2.2Ω | 2.2Ω | 508061 | | |
| L23 | Fil. Choke | .8Ω | | 507586 | | |
| L24 | Ratio Det. Trans. | 6.7Ω | .3Ω | 507321 | | |
| L25 | RF Choke | 17Ω | | 507373 | | |
| L26 | Horiz. Freq. | 80Ω | | 508077 | | |
| L27 | Fil. Choke | 0Ω | | 507584 | | |
| L28 | Horiz. Lin. | 6.2Ω | | 162056 | | Tap at 1.9Ω |
| L29 | Horiz. Size | .5Ω | 40Ω | 508218 | | |
| L30 | FM Ant. | 1Ω | | 507586 | | |
| L31 | FM RF Chk. | 3.7Ω | | 507935 | | |
| L32 | FM RF | 0Ω | | 507941 | | |
| L33 | Para. Supp. | 0Ω | | 506581 | | Wound on 1KΩ resistor |
| L34 | FM Osc. | 0Ω | | 507942 | | |
| L35 | Loop Ant. | 2Ω | | 508212 | | |
| L36 | AM Ant. | .5Ω | 2.6Ω | 508184 | | |
| L37 | AM Osc. | 8.6Ω | | 508195 | | Tap at 1Ω |
| L38 | 1st AM IF | 24Ω | 24Ω | 505867 | | |
| L39 | 1st FM IF | 1Ω | 1Ω | 506080 | | |
| L40 | 2nd AM IF | 24Ω | 24Ω | 505867 | | |
| L41 | 2nd FM IF | 2.2Ω | .6Ω | 505905 | | |
| L42 | Ratio Det. Trans. | 2Ω | 1.2Ω | 508179 | | |

## PHONO CARTRIDGE and NEEDLE

| ITEM No. | REPLACEMENT DATA STEW. WARN. PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | SHURE PART No. CARTRIDGE | SHURE PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|
| M1 | 508432 | ACD-J | A-1<br>A-3 | | | |

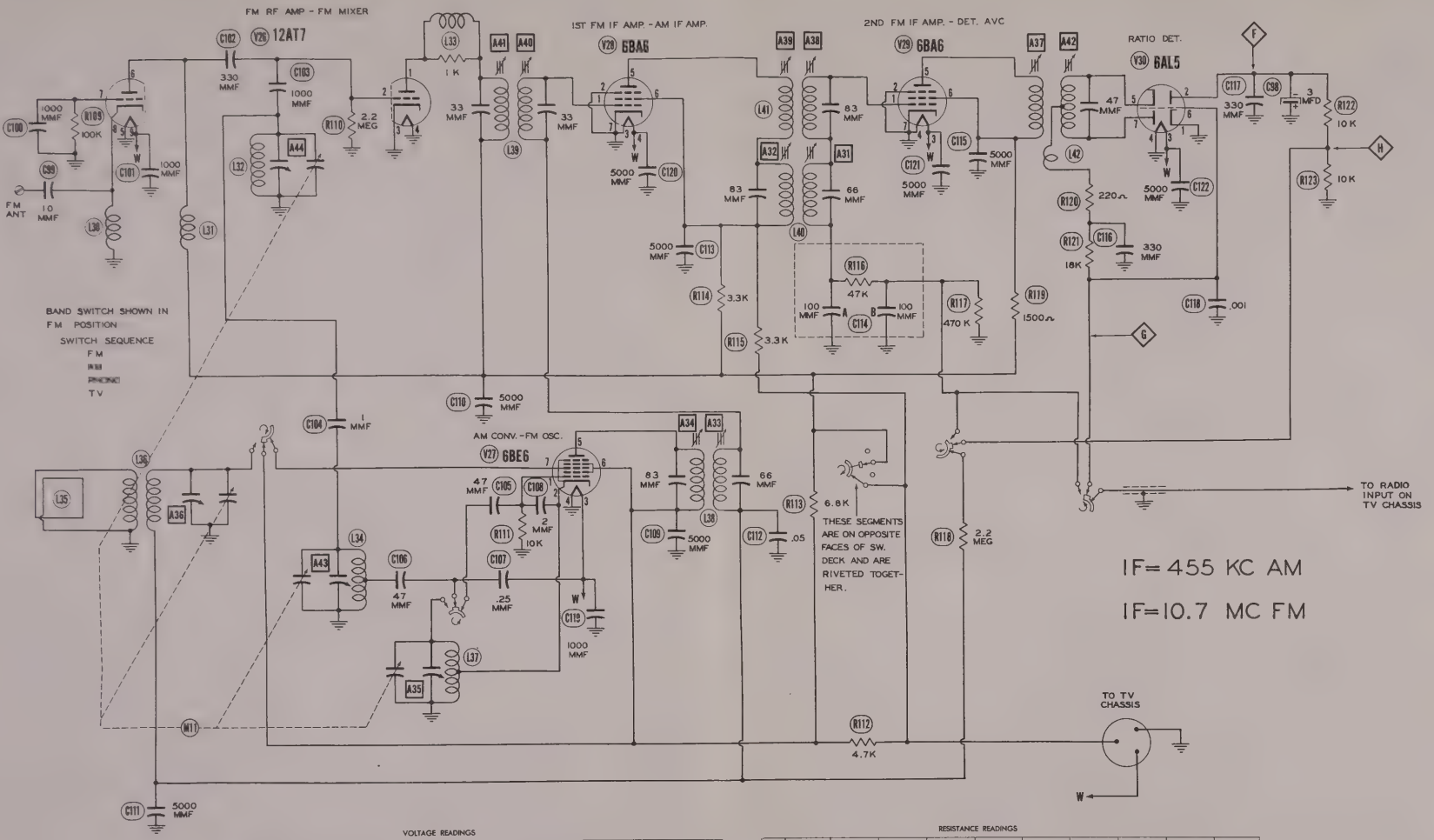
ASTATIC AND SHURE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED.

## DIAL LIGHTS

| ITEM No. | BASE TYPE | VOLTS | AMPS. | BEAD COLOR | REPLACEMENT DATA STEW. WARN. PART No. | | NOTES |
|---|---|---|---|---|---|---|---|
| M2 | Bayonet | 6-8 | .15 | Brown | 118921 | | Type #47 |
| M3 | Bayonet | 6-8 | .15 | Brown | 118921 | | Type #47, models 9104-A, B, C |
| M4 | Bayonet | 6-8 | .15 | Brown | 118921 | | Type #47, models 9104-A, B, C |
| M5 | Bayonet | 6-8 | .15 | Brown | 118921 | | Type #47, models 9104-A, B, C |

## MISCELLANEOUS

| ITEM No. | PART NAME | STEW. WARN. PART No. | NOTES |
|---|---|---|---|
| M6A | RF Tuner | 508080 | Complete with tubes (Standard Coil) |
| B | RF Tuner | 508075 | Complete with tubes (Sarkes Tarzian) |
| M7 | Fuse | 508063 | .25A 250V Type GJV |
| M8 | Switch | 508203 | TV-Phono-AM-FM includes volume control (On TV chassis) |
| M9 | Switch | 508185 | TV-Phono-AM-FM (On Radio chassis) |
| M10 | Ion Trap | 506803 | |
| M11 | Tuning Cap. | 508186 | Models 9104-A, B, C only |
| | Trimmer | 508324 | Antenna 4-70MMFD |
| | Trimmer | 508071 | Horiz. drive 10-160MMFD |
| | Safety Glass | 507911 | Models 9104-A, B, C |
| | Safety Glass | 508440 | Models 9103 B, C |
| | Cabinet | 508100 | Model 9104A |
| | Cabinet | 508200 | Model 9104B |
| | Cabinet | 508550 | Model 9104C |
| | Cabinet | 508152 | Model 9103B |
| | Cabinet | 508175 | Model 9103C |
| | Dial Scale | 508204 | AM-FM Models 9104A, B, C |
| | Knob | 507916 | Channel selector |
| | Knob | 507917 | Fine tuning |
| | Knob | 508208 | TV-Phono-AM-FM |
| | Knob | 508206 | Brightness, Horiz. hold |
| | Knob | 508209 | Contrast |
| | Knob | 508207 | Volume, tone |
| | Knob | 508204 | AM-FM course tuning |
| | Knob | 508205 | AM-FM fine tuning |
| | Knob | 502563 | Antenna |
| | Knob | 507918 | Models 9103B, C any controls except channel selector, fine tuning and antenna. |




VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| † | V26 | 12AT7 | 135VDC | -.8VDC | 0V. | 0V. | 0V. | 135VDC | -.5VDC | 0V. | 6.3VAC |
| † | V27 | 6BE6 | §-4.3VDC | 0V. | 6.3VAC | 0V. | 80VDC | 100VDC | 100VDC | | |
| ¶ | V27 | 6BE6 | §-5.9VDC | 0V. | 6.3VAC | 0V. | 100VDC | 100VDC | -.6VDC | | |
| † | V28 | 6BA6 | -.6VDC | 0V. | 0V. | 6.3VAC | 110VDC | 110VDC | 0V. | | |
| ¶ | V28 | 6BA6 | -.6VDC | 0V. | 0V. | 6.3VAC | 100VDC | 100VDC | 0V. | | |
| † | V29 | 6BA6 | -.6VDC | 0V. | 6.3VAC | 0V. | 110VDC | 110VDC | 0V. | | |
| ¶ | V29 | 6BA6 | -.6VDC | 0V. | 6.3VAC | 0V. | 65VDC | 65VDC | 0V. | | |
| † | V30 | 6AL5 | 0V. | -.6VDC | 6.3VAC | 0V. | -.2VDC | -.3VDC | -.2VDC | | |

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| † | V26 | 12AT7 | #950Ω | 2.2 Meg. | 0Ω | 0Ω | 0Ω | #950Ω | 100KΩ | 1Ω | .1Ω |
| † | V27 | 6BE6 | 10KΩ | 1Ω | .1Ω | 0Ω | #3.3KΩ | #3.3KΩ | #3.3KΩ | | |
| ¶ | V27 | 6BE6 | 10KΩ | 1Ω | .1Ω | 0Ω | #4KΩ | #4KΩ | 2.7 Meg. | | |
| † | V28 | 6BA6 | 2.2 Meg. | 0Ω | 0Ω | .1Ω | #2.5KΩ | #2.5KΩ | 0Ω | | |
| ¶ | V28 | 6BA6 | 2.6 Meg. | 0Ω | 0Ω | .1Ω | #3.3KΩ | #3.3KΩ | 0Ω | | |
| † | V29 | 6BA6 | 520KΩ | 0Ω | .1Ω | 0Ω | #2.5KΩ | #2.5KΩ | 0Ω | | |
| ¶ | V29 | 6BA6 | 520KΩ | 0Ω | .1Ω | 0Ω | #5KΩ | #5KΩ | 0Ω | | |
| † | V30 | 6AL5 | 0Ω | 20KΩ | .1Ω | 0Ω | Inf. | Inf. | Inf. | | |

† TAKEN IN "FM" POSITION.
¶ TAKEN IN "AM" POSITION.
# MEASURED FROM PIN 8 OF V24.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

**STEWART-WARNER**
**MODELS 9103-B, -C, 9104-A, -B, -C**

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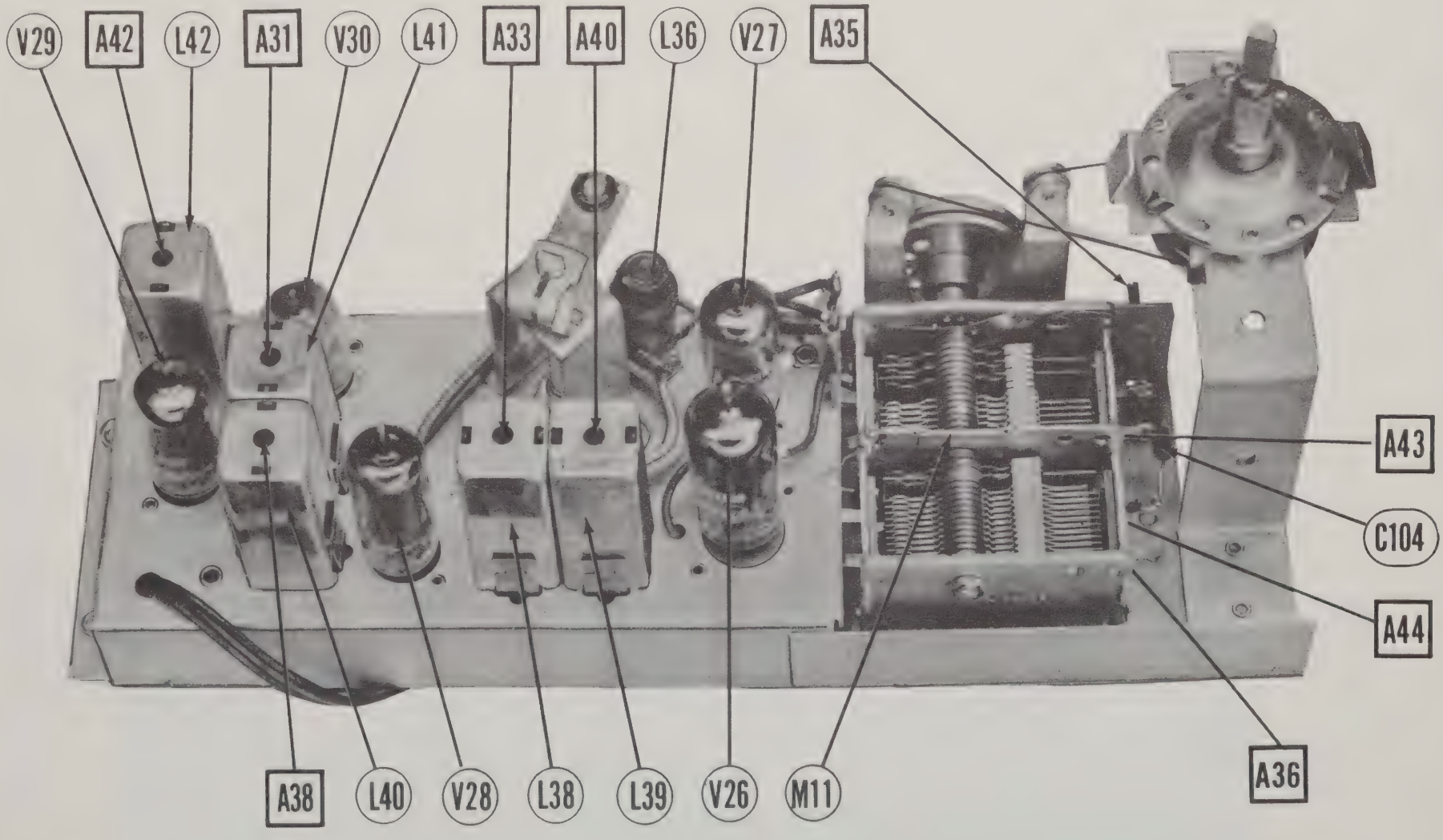
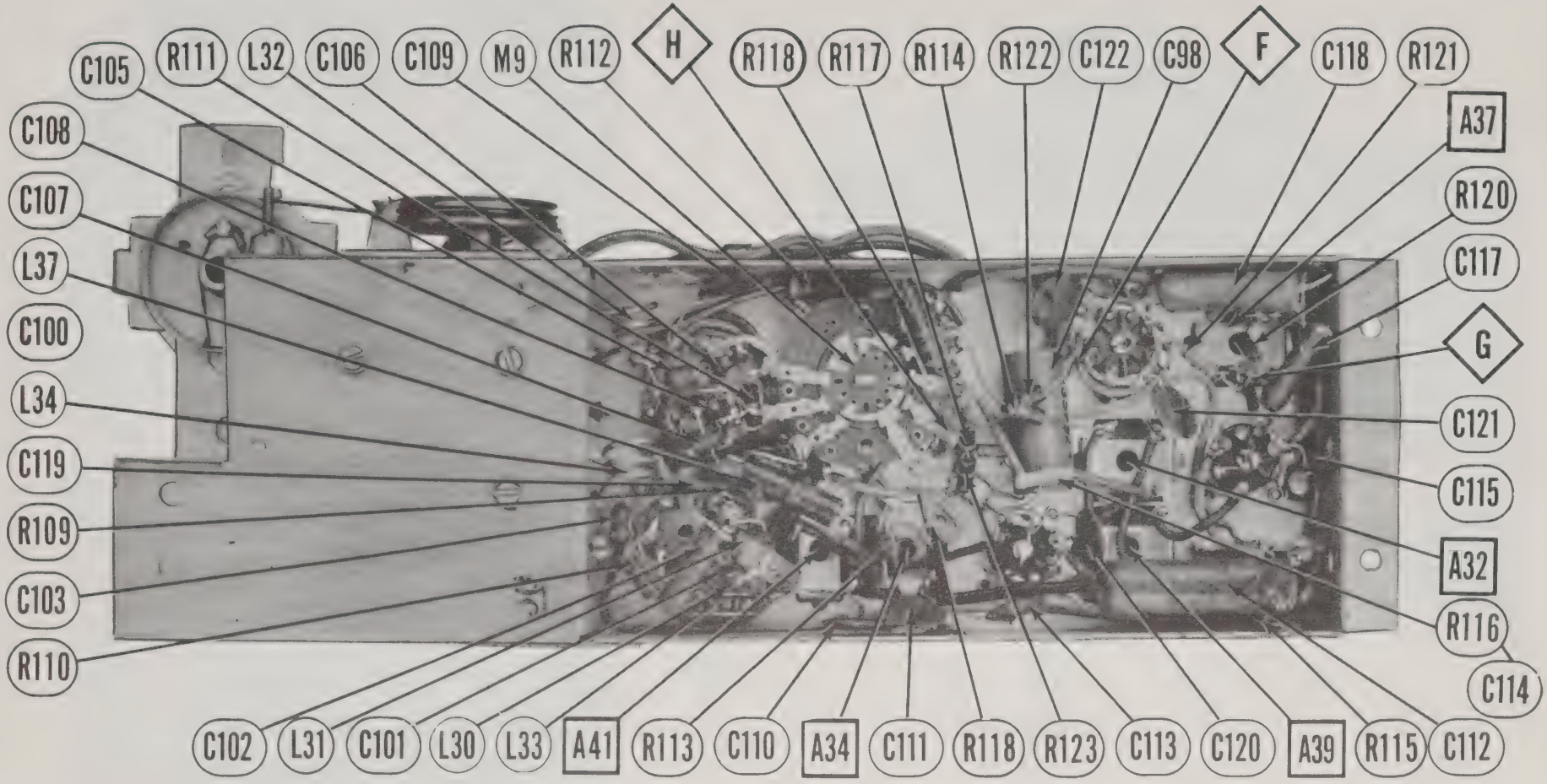
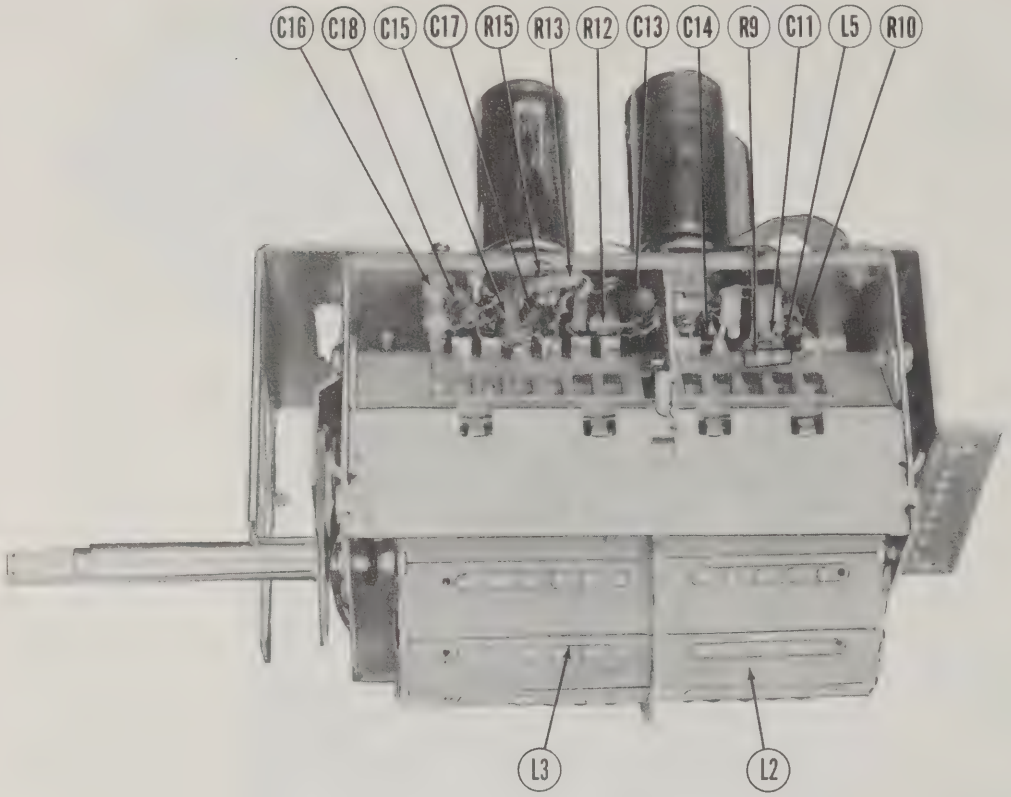
# RADIO SCHEMATIC



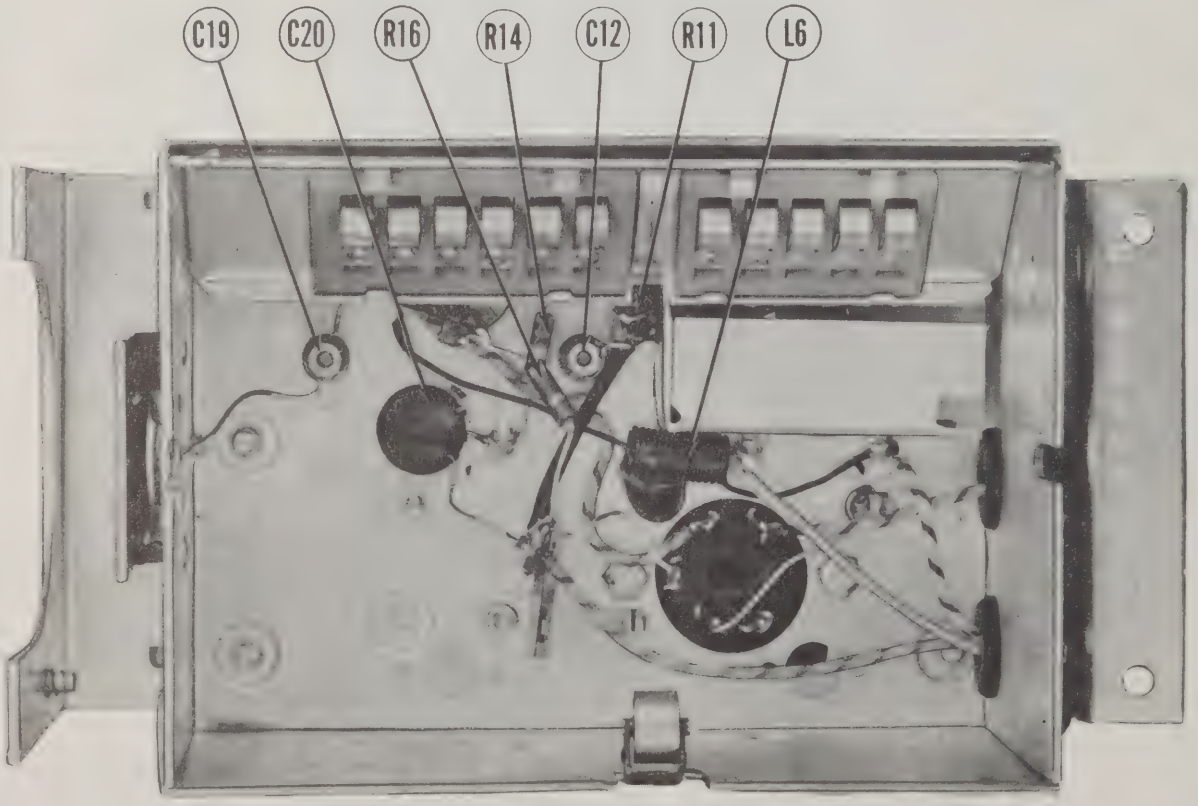

RADIO CHASSIS-TOP VIEW



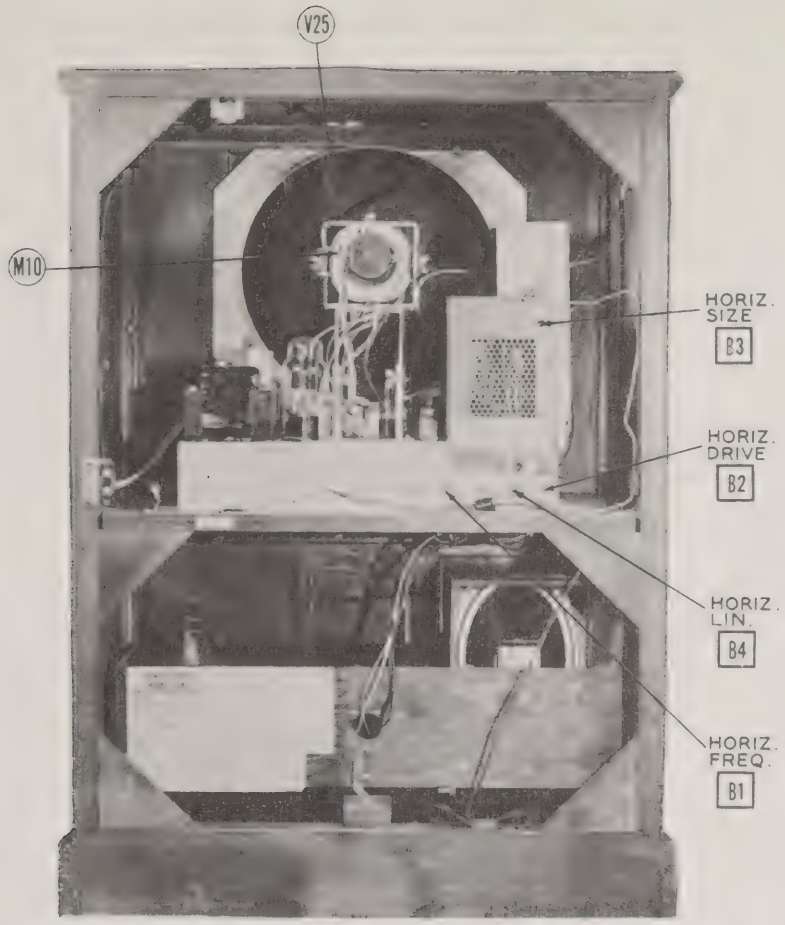

RADIO CHASSIS-BOTTOM VIEW




RF TUNER-RIGHT SIDE




RF TUNER-BOTTOM VIEW




CABINET–REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station preferably a test pattern.

Turn horizontal hold control to the mid-position of its range.

Adjust horizontal frequency slug B1 until picture is in sync horizontally.

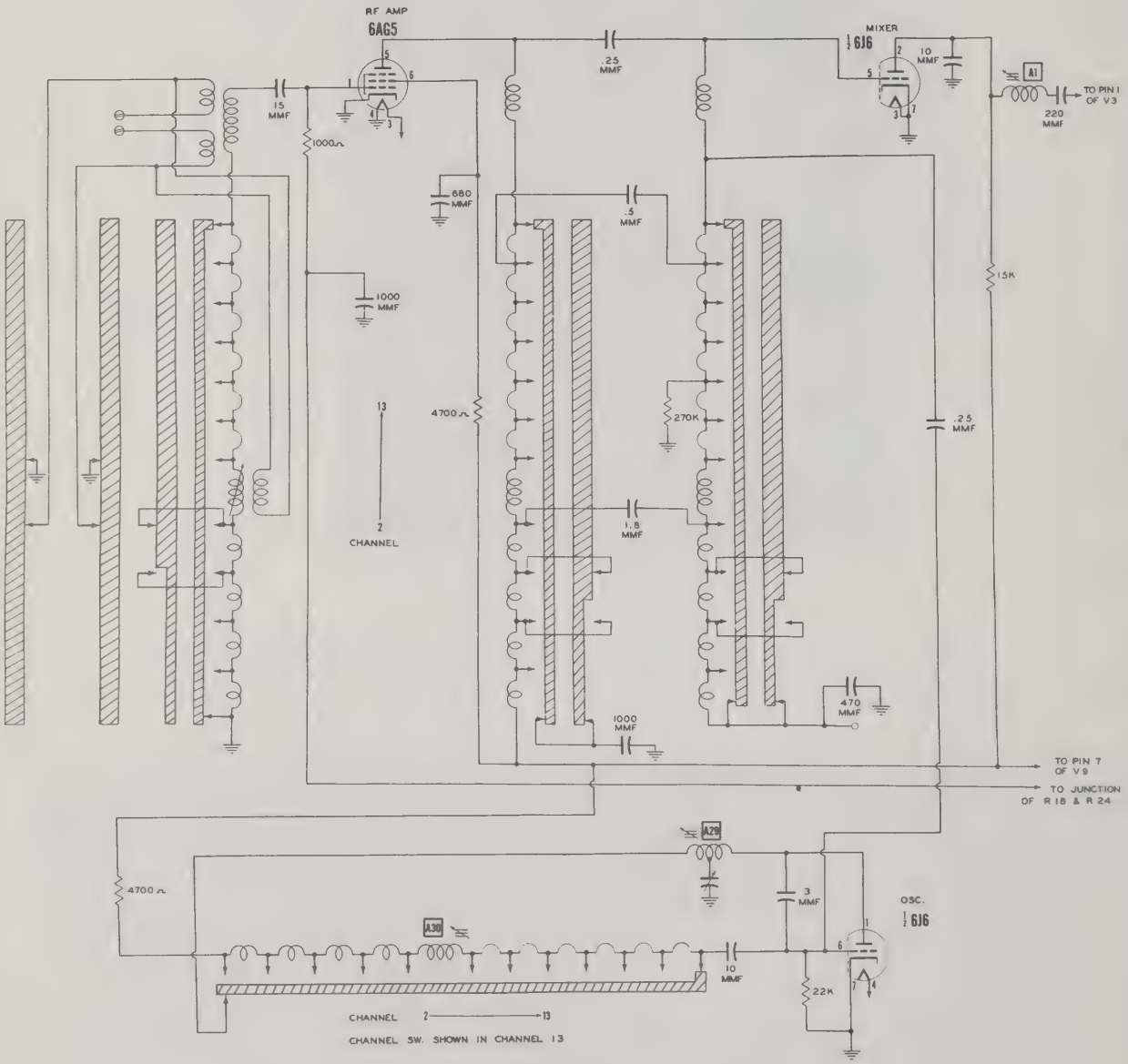
Turn the horizontal drive trimmer (B2) clockwise as far as possible without crowding the right side of picture.

Adjust horizontal width slug (B3) until picture fills mask horizontally.

Adjust horizontal linearity slug (B4) until picture is symmetrical from left to right. A slight readjustment of B2 may be required for optimum results.

## DISASSEMBLY INSTRUCTIONS

1. Remove twelve control knobs from front of cabinet.
2. Remove seven screws holding rear cover. Remove cover.
3. Disconnect built-in antenna leads.
4. Disconnect speaker connection.
5. Remove external antenna terminal strip.
6. Remove phono plug.
7. Remove four 5/16" hex head bolts from bottom of chassis. Remove chassis.
8. Remove four hex head nuts from speaker. Remove speaker.

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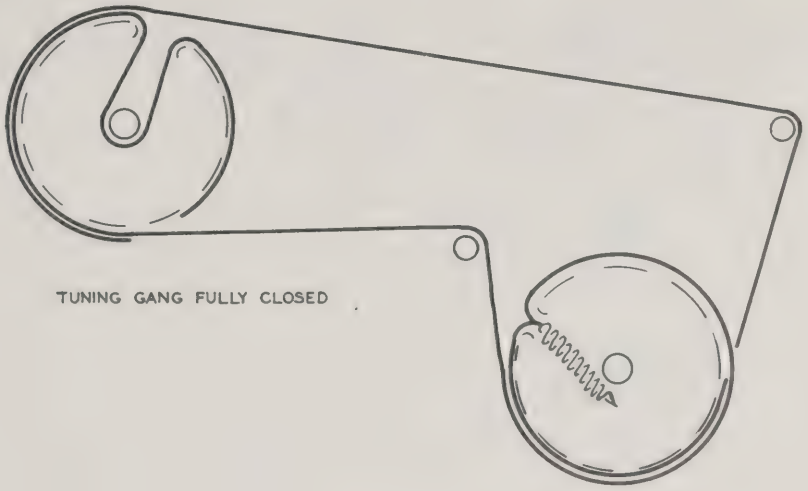
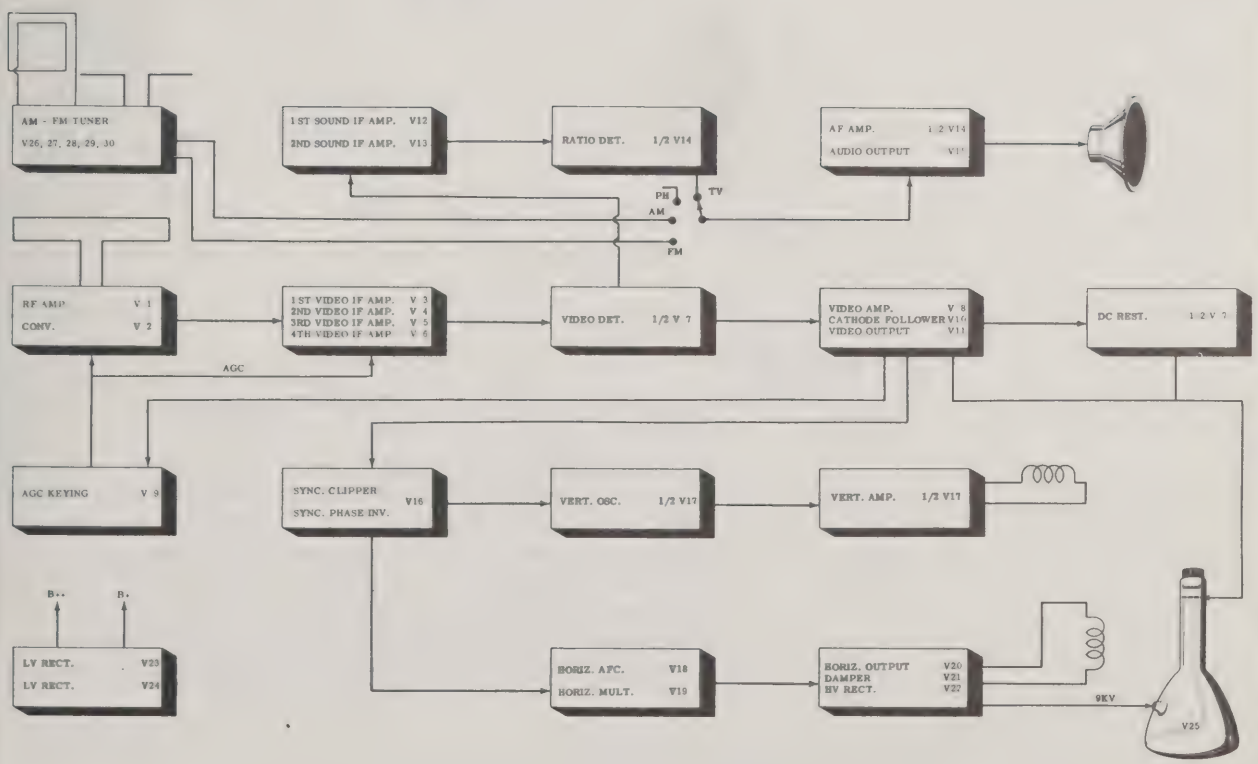
# SARKES TARZIAN TUNER - PART NO. 508075




## DIAL CORD STRINGING

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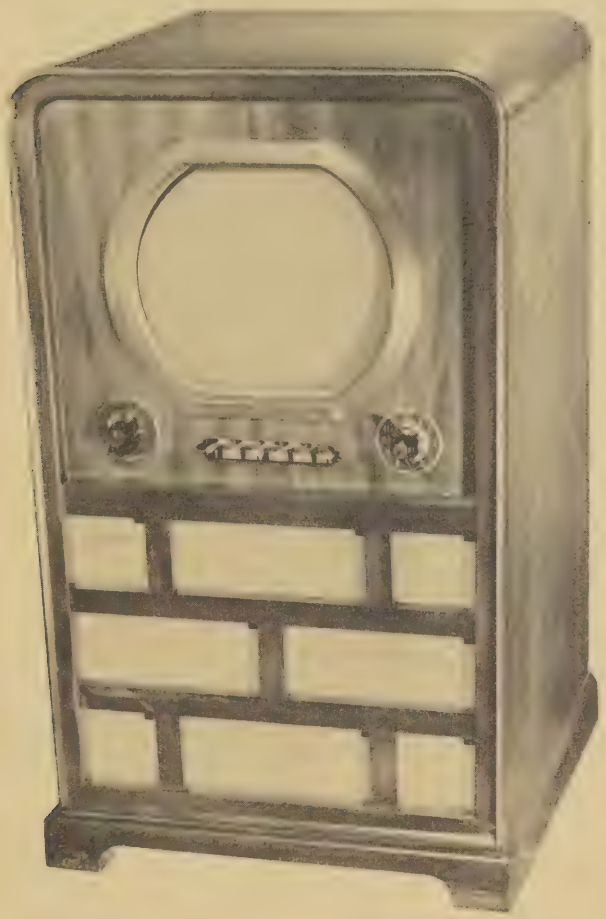

TRUETONE MODEL
2D1088A

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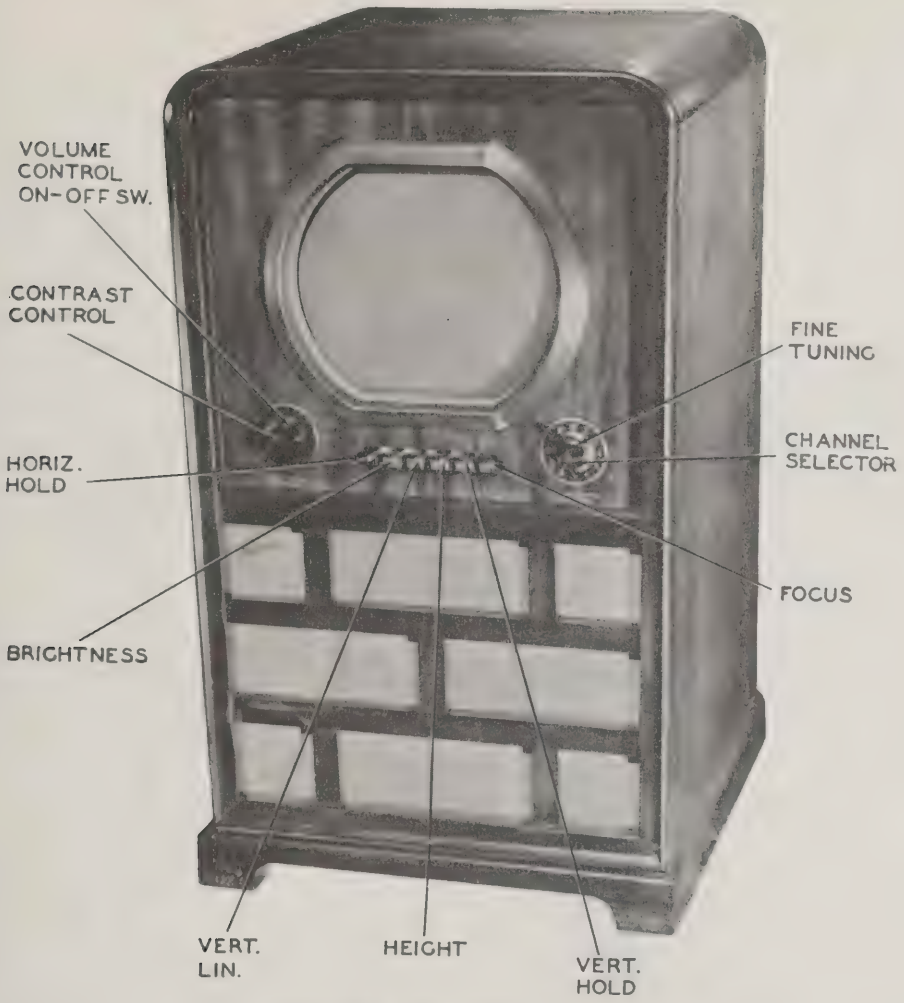


TRUETONE
MODEL 2D1088A

TRUETONE MODEL 2D1088A

| | |
|---|---|
| TRADE NAME | Truetone, Model 2D1088A (Fact. Mod. 28T12-972) |
| SUPPLIER | Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo. |
| TYPE SET | Television Receiver |
| TUBES | Twenty Two |

POWER SUPPLY 105-125 Volts AC 60 Cycle RATING 1.9 Amp. at 117 Volts AC
TUNING RANGE—Channels 2 thru 13

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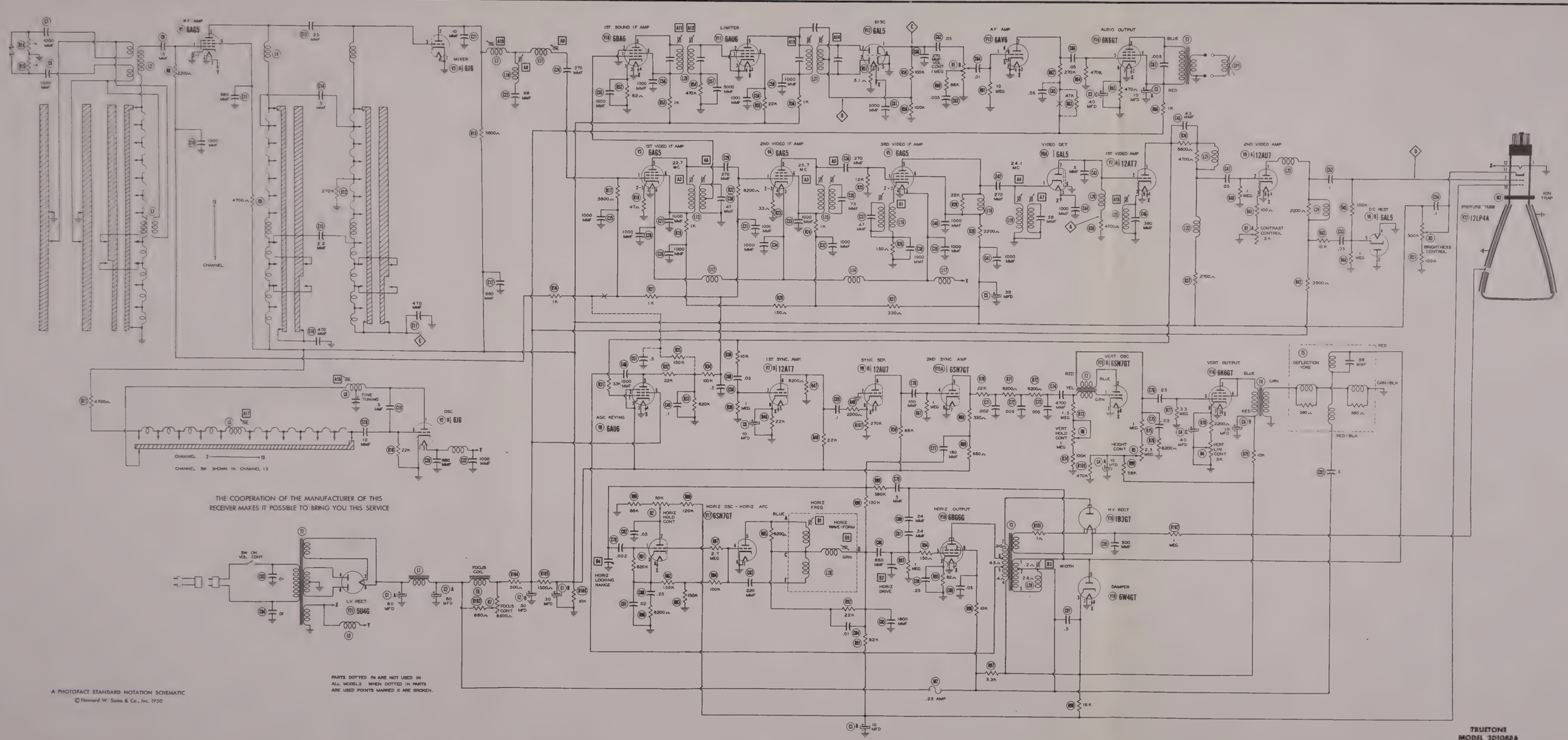


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PARTS DOTTED IN ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

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TRUETONE MODEL 2D1088A



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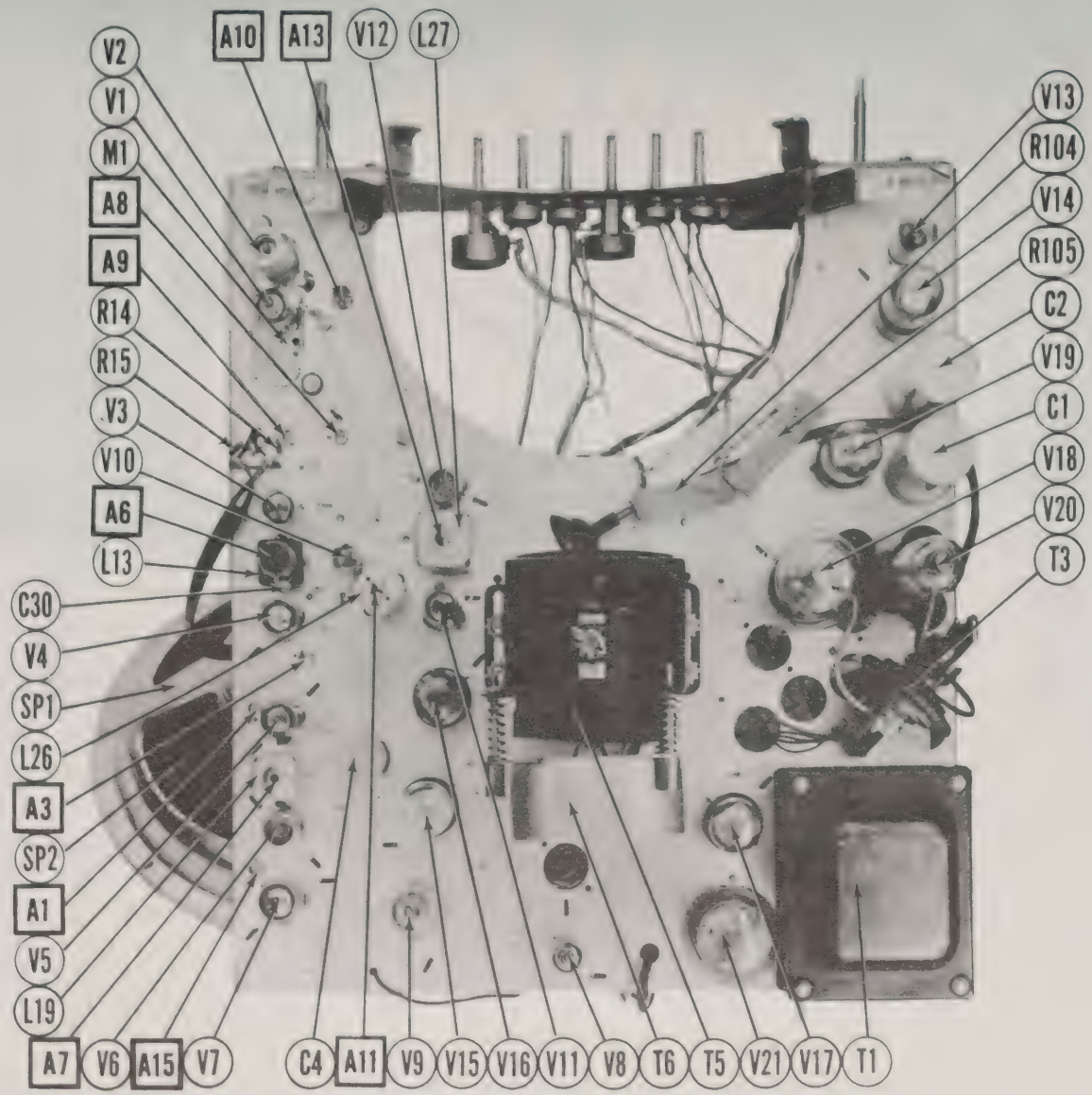
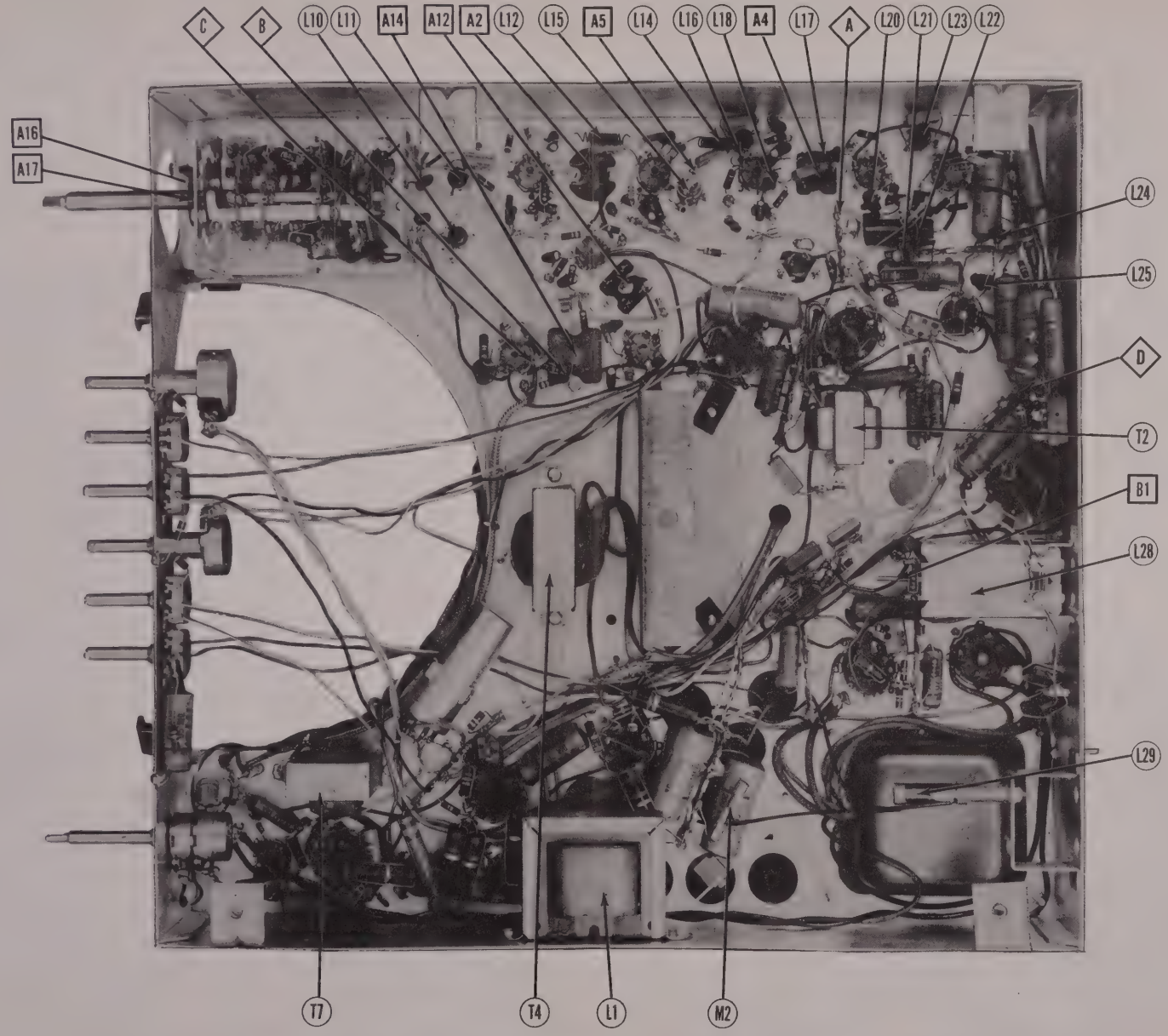
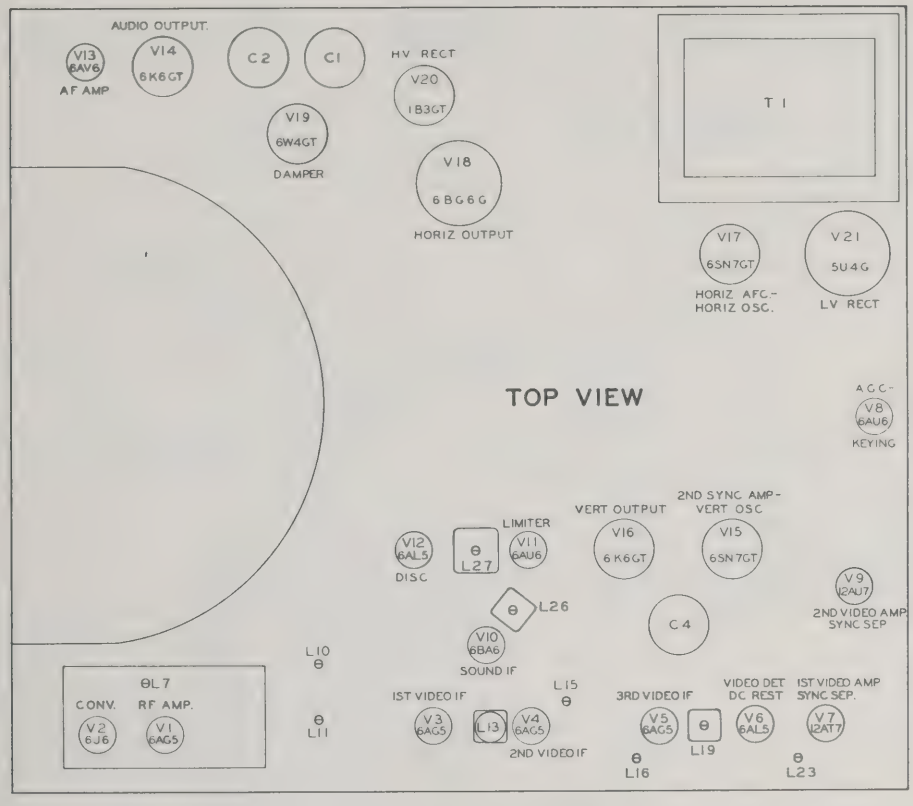
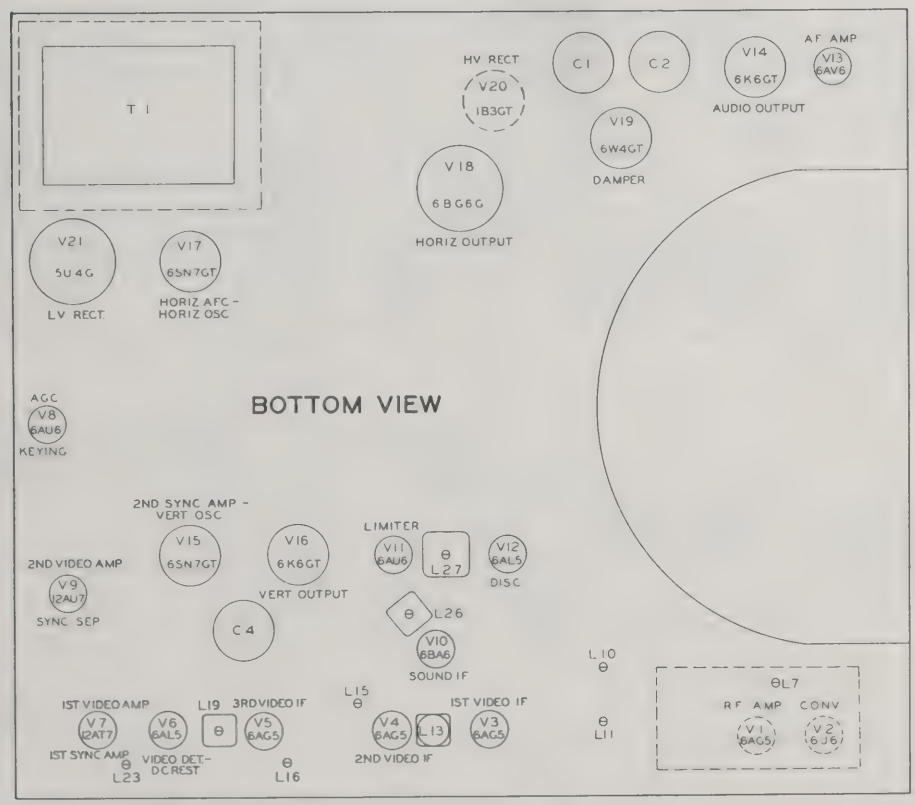



CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION




# TUBE PLACEMENT CHART

# ALIGNMENT INSTRUCTIONS

## ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the picture tube is to be removed while alignment is being performed the high voltage lead should be securely taped and dressed away from the chassis.

## VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 with pin 1 removed to prevent erroneous indications.
Connect a 10KΩ resistor in series with the vertical amplifier input lead and a 5000MMF capacitor across vertical amplifier terminals. This receiver uses one of two tuners, a switch type tuner and a turret type tuner, determine which tuner is used before attempting alignment. Frequencies used for the switch type tuner will be designated by an asterisk (*) and the frequencies used by the turret type tuner will be designated by a dagger (†). If a turret type tuner is used omit step 7.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | Not used | 20.2MC (Unmod.) | Any | Use VTVM. DC Probe to Point (A). Common to chassis. | A1 | Adjust for MINIMUM deflection. |
| 2. | Direct | " | " | 22.7MC | " | " | A2 | Adjust for maximum deflection. Attenuate signal generator to maintain a maximum -2 volts reading. |
| 3. | Direct | " | " | 25.7MC (Unmod.) | " | " | A3 | Adjust for maximum deflection. |
| 4. | Direct | " | " | 24.1MC * (Unmod.)<br>23.7MC † (Unmod.) | " | " | A4 | " |
| 5. | Direct | " | " " | 27.7MC (Unmod.) | " | " | A5 | Adjust for MINIMUM deflection. |
| 6. | Direct | " | " | 21.7MC (Unmod.) | " | " | A6, A7 | " |
| 7. | Direct | " | " | 17MC (Unmod.) | " | " | A8 | " |
| 8. | Direct | " | 24MC (10MC SWP) | 21.7MC<br>26.2MC | " | Vert. Amp. thru detector probe as shown in fig 1 to pin 5 (plate) of 6AG5 (V3). Low side to chassis. | A9, A10, | Short AGC line to chassis. If switch type tuner is used adjust A9 and A10 for response curve similar to one shown with solid line in figure 2. If turret type tuner is used adjust A10 for response curve similar to one shown with dotted line in figure 2. A SLIGHT readjustment of A8 may be required to obtain optimum results. |
| 9. | Direct | " | " | 21.7MC<br>22.4MC<br>26.2MC | " | Vert. Amp. to Point (A). Low side to chassis. | | Connect negative terminal of a 3 volt battery to junction of R21 and C31 and positive terminal to chassis. Check for response curve similar to figure 3. If necessary, SLIGHTLY retouch A2, A3 and A4, A6 and A7 for proper response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 10. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 21.7MC (Unmod.) | Any | DC Probe to Point (B). Common to chassis. | A11, A12, A13 | Adjust for maximum deflection. |
| 11. | Direct | " | " | " | DC Probe to Point (C). Common to chassis. | A14 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 10. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 21.7MC (450KC SWP) | 21.7MC | Any | Vert. Amp. to Point (B). Low side to chassis. | A11, A12, A13 | Adjust for maximum amplitude and symmetry as per figure 4. |
| 11. | Direct | " | " | " | " | Vert. Amp. thru 10KΩ to Point (C). Low side to chassis. | A14 | Adjust A14 to place 21.7MC at center of crossover lines as per figure 5. Slightly retouch A13 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ADJUSTMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 12. | .01MFD | High side to pin 2 (Grid) of 12AT7 (V7). Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe thru detector probe as shown in figure 1 to point (D). Low side to chassis. | A15 | Adjust for minimum deflection. |

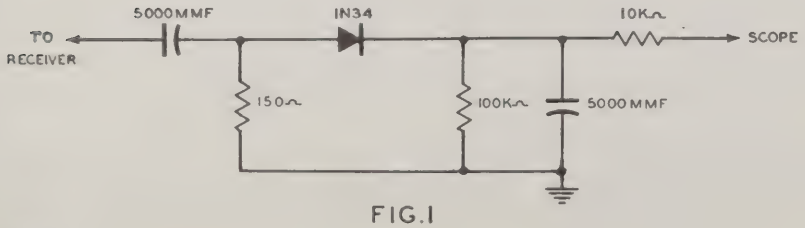



FIG.1

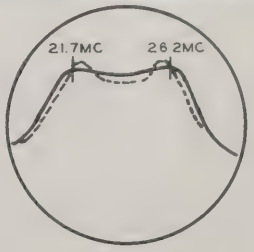



FIG.2

## OSCILLATOR ALIGNMENT (SWITCH TYPE TUNER)

Remove dummy converter tube and replace the original 6J6 in its socket.
The RF and mixer portions of this receiver are pre-set at the factory and should not require adjustment in the field.
The signal generator output lead should be terminated with its characteristic impedance usually 50 ohms.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 13. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 215.75MC | 13 | DC Probe to Point (C). Common to chassis. | A16 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |
| 14. | " | " | 209.75MC<br>203.75MC<br>197.75MC<br>191.75MC<br>185. 75MC<br>179.75MC | 12<br>11<br>10<br>9<br>8<br>7 | " | | Check to see if a zero reading can be obtained well within the range of the fine tuning control. If not, a compromise adjustment of A16 will be required. |
| 15. | " | " | 87.75MC | 6 | " | A17 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |
| 16. | " | " | 81.75MC<br>71.75MC<br>65.75MC<br>59.75MC | 5<br>4<br>3<br>2 | " | | Check to see if a zero reading can be obtained well within the tuning range of the fine tuning control. If not, a compromise adjustment of A17 will be required. |

## RF AND MIXER ALIGNMENT (TURRET TYPE TUNER)

The sweep generator output lead should be terminated with its characteristic impedance usually 50 ohms.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 17. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 207MC (10MC SWP) | 205.25MC<br>209.75MC | 12 | Vert. Amp. to Point (E). Low side to chassis. | A18, A19, A20 | Adjust for response curve similar to figure 6 with markers above 80%. |
| 18. | " | " | 213MC (10MC SWP) | 211.25MC<br>215.75MC | 13 | " | | Check all channels for response curve similar to figure 6. If markers fall below 70% on any channel make slight adjustment of A18 and A19 and A20 with channel selector set for that channel. Recheck all channels to see that they have not been seriously effected. |
| | | | 201MC (10MC SWP) | 199.25MC<br>203.75MC | 11 | | | |
| | | | 195MC (10MC SWP) | 193.25MC<br>197.75MC | 10 | | | |
| | | | 189MC (10MC SWP) | 187.25MC<br>191.75MC | 9 | | | |
| | | | 183MC (10MC SWP) | 181.25MC<br>185.75MC | 8 | | | |
| | | | 177MC (10MC SWP) | 175.25MC<br>179.75MC | 7 | | | |
| | | | 85MC (10MC SWP) | 83.25MC<br>87.75MC | 6 | | | |
| | | | 79MC (10MC SWP) | 77.25MC<br>81.75MC | 5 | | | |
| | | | 69MC (10MC SWP) | 67.25MC<br>71.75MC | 4 | | | |
| | | | 63MC (10MC SWP) | 61.25MC<br>65.75MC | 3 | | | |
| | | | 57MC (10MC SWP) | 55.25MC<br>59.75MC | 2 | | | |

## OSCILLATOR ALIGNMENT (TURRET TYPE TUNER)

Remove the dummy converter tube and replace the original 6J6 in its socket.
Set the fine tuning control to the mid-position of its range.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A21.
It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A21 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the individual channel oscillator adjustment for each channel that is off frequency. The individual channel oscillator adjustments are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 19. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 215.75MC (Unmod.) | 13 | DC Probe to Point (C). Common to chassis. | A22 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |
| | | | 209.75MC | 12 | | A23 | |
| | | | 203.75MC | 11 | | A24 | |
| | | | 197.75MC | 10 | | A25 | |
| | | | 191.75MC | 9 | | A26 | |
| | | | 185.75MC | 8 | | A27 | |
| | | | 179.75MC | 7 | | A28 | |
| | | | 87.75MC | 6 | | A29 | |
| | | | 81.75MC | 5 | | A30 | |
| | | | 71.75MC | 4 | | A31 | |
| | | | 65.75MC | 3 | | A32 | |
| | | | 59.75MC | 2 | | A33 | |

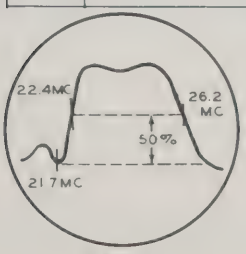


FIG. 3

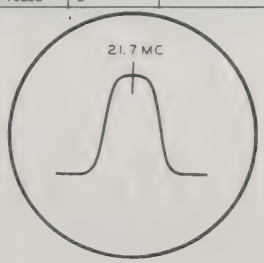


FIG. 4

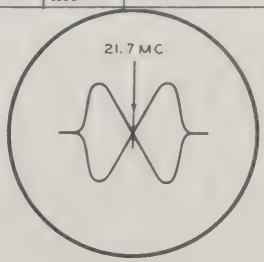


FIG. 5

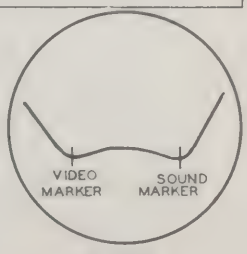


FIG. 6

# VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | -1VDC | 0V. | 6.3VAC | 0V. | 130VDC | 125VDC | 0V. | | |
| V 2 | 6J6 | 90VDC | 100VDC | 6.3VAC | 0V. | -1.4VDC | §-5.5VDC | 0V. | | |
| V 3 | 6AG5 | -1VDC | .4VDC | 0V. | 6.3VAC | 110VDC | 120VDC | .4VDC | | |
| V 4 | 6AG5 | -.9VDC | .2VDC | 6.3VAC | 0V. | 115VDC | 115VDC | .2VDC | | |
| V 5 | 6AG5 | -.2VDC | 1.2VDC | 6.3VAC | 0V. | 110VDC | 110VDC | 1.2VDC | | |
| V 6 | 6AL5 | 0V. | 0V. | 6.3VAC | 0V. | 1VDC | 0V. | -.3VDC | | |
| V 7 | 12AT7 | 90VDC | -.3VDC | 0V. | 6.3VAC | 6.3VAC | 33VDC | -.8VDC | .8VDC | ▯V. |
| V 8 | 6AU6 | ▲-40VDC | ▲0V. | 0V. | 6.3VAC | ▲-115VDC | ▲140VDC | ▲0V. | | |
| V 9 | 12AU7 | 260VDC | 0V. | 12VDC | 6.3VAC | 6.3VAC | 130VDC | 0V. | 11VDC | 0V. |
| V 10 | 6BA6 | 0V. | 0V. | 0V. | 6.3VAC | 115VDC | 115VDC | 1.3VDC | | |
| V 11 | 6AU6 | -.4VDC | 0V. | 6.3VAC | 0V. | 125VDC | 90VDC | 0V. | | |
| V 12 | 6AL▯ | 0V. | -.8VDC | 6.3VAC | 1.6VAC | 0V. | 0V. | -.8VDC | | |
| V 13 | 6AV6 | -.5VDC | 0V. | 6.3VAC | 0V. | 0V. | 0V. | 90VDC | | |
| V 14 | ▯K6GT | 0V. | 6.3VAC | 235VDC | 250VDC | 0V. | 0V. | ▯V. | 15VDC | |
| V 15 | 6SN7GT | -13VDC | 110VDC | 0V. | -1.2VDC | 120VDC | 0V. | 0V. | 6.3VAC | |
| V 16 | 6K6GT | 33VDC | 6.3VAC | 380VDC | 380VDC | -.2VDC | 0V. | 0V. | 50VDC | |
| V 17 | 6SN7GT | -11VDC | 100VDC | -9.4VDC | -55VDC | 205VDC | 0V. | 0V. | 6.3VAC | |
| V 18 | 6BG6G | 0V. | 6.3VAC | 6.5VDC | 265VDC | -14VDC | -14VDC | 0V. | 265VDC | TOP CAP * |
| V 19 | 6W4GT | 0V. | 0V. | 460VDC | 0V. | 370VDC | -14VDC | 0V. | 6.3VAC | |
| V 20 | ▯B3GT | * DO NOT MEASURE. | | | | | | | | |
| V 21 | 5U4G | 0V. | 380VDC | 0V. | 400VAC | 0V. | 400VAC | 0V. | 380VDC | |
| V 22 | 12LP4A | 0V. | .5VDC | PIN 10 385VDC | PIN 11 130VDC | PIN 12 6.3VAC | | | | |

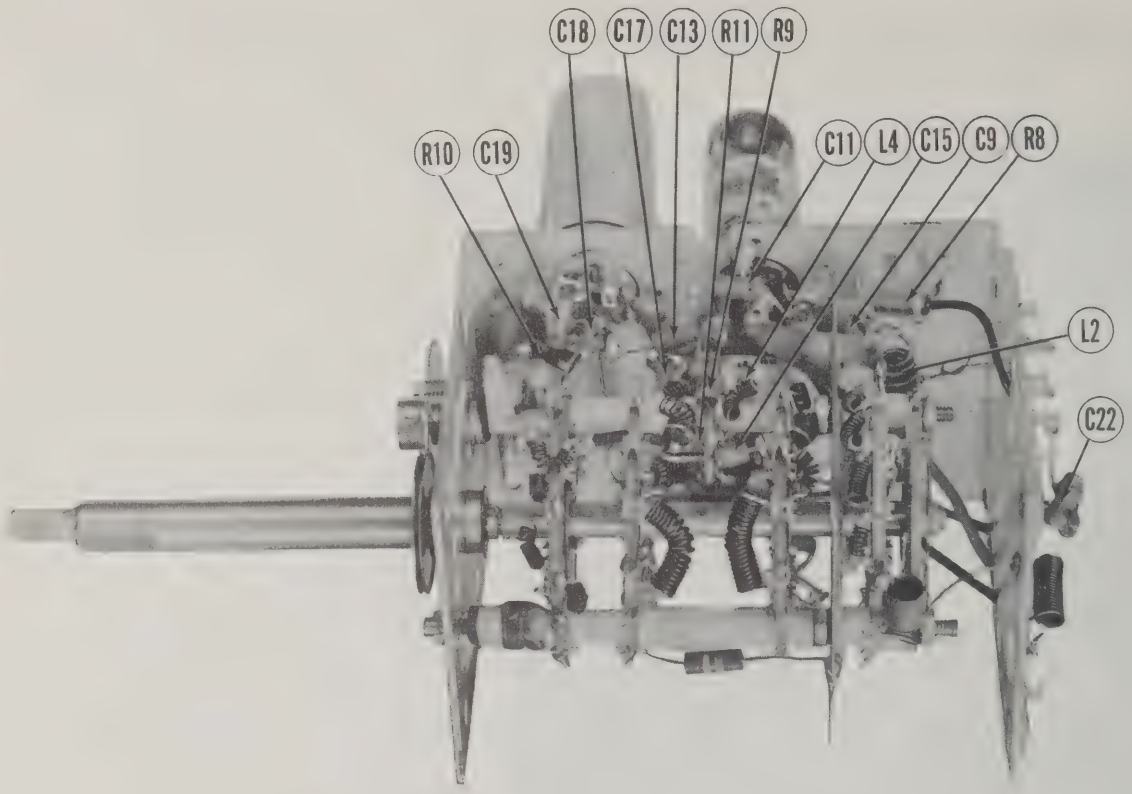
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.
▲ MEASURED FROM JUNCTION OF R106 AND C1B.

RESISTANCE READINGS

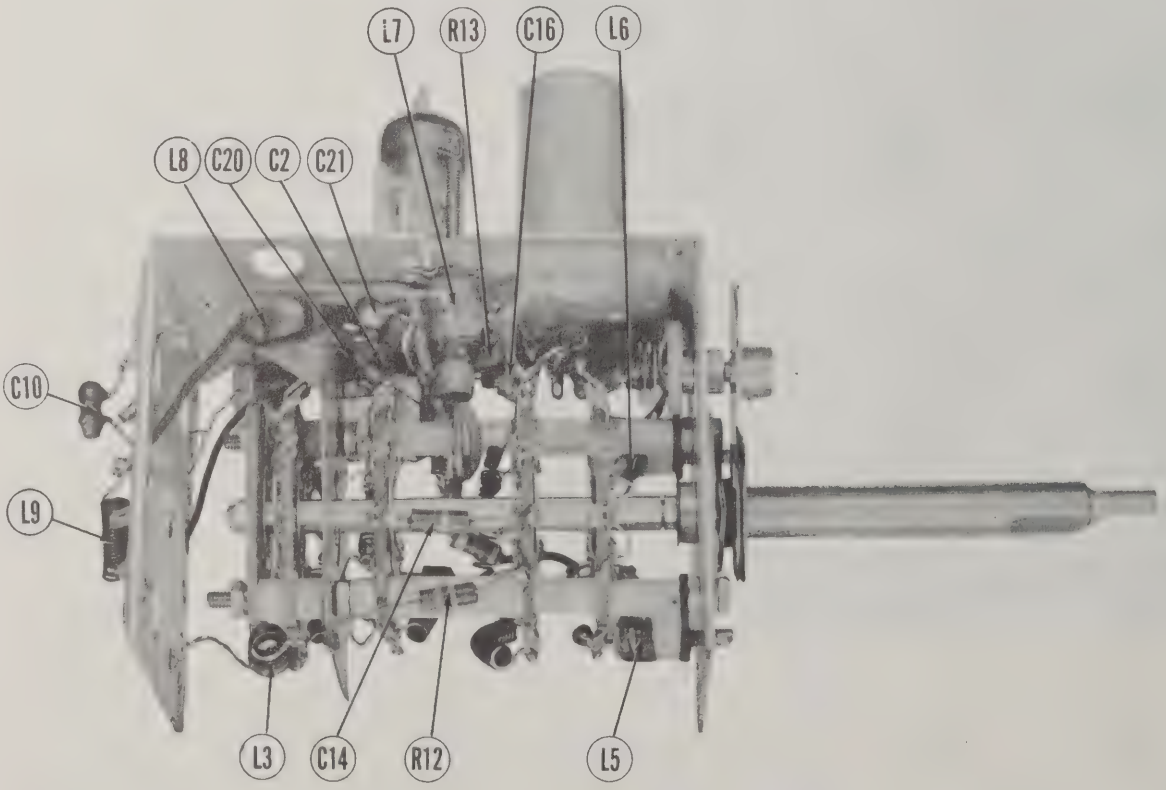
| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AG5 | 925KΩ | 0Ω | .1Ω | 0Ω | †2000Ω | †7000Ω | 0Ω | | |
| V 2 | 6J6 | †8000Ω | †9000Ω | .1Ω | 0Ω | 270KΩ | 22KΩ | 0Ω | | |
| V 3 | 6AG5 | 925KΩ | 47Ω | 0Ω | .1Ω | †3.8KΩ | †3.8KΩ | 47Ω | | |
| V 4 | 6AG5 | 930KΩ | 33Ω | .1Ω | 0Ω | †3.6KΩ | †3.6KΩ | 33Ω | | |
| V 5 | 6AG5 | 12KΩ | 150Ω | .1Ω | 0Ω | †4.5KΩ | †4.5KΩ | 150Ω | | |
| V 6 | 6AL5 | .2Ω | 0Ω | .1Ω | 0Ω | 1 Meg. | 0Ω | 4.7KΩ | | |
| V 7 | 12AT7 | †11KΩ | 4.7KΩ | .4Ω | .1Ω | .1Ω | †13KΩ | 1 Meg. | 22KΩ | 0Ω |
| V 8 | 6AU6 | †44KΩ | †2.3KΩ | 0Ω | .1Ω | 840KΩ | †850Ω | †2.3KΩ | | |
| V 9 | 12AU7 | †4.8KΩ | 1 Meg. | 3.1KΩ | .1Ω | .1Ω | †70KΩ | 0Ω | 270KΩ | 0Ω |
| V 10 | 6BA6 | 0Ω | 0Ω | 0Ω | .1Ω | †3.3KΩ | †3.3KΩ | 82Ω | | |
| V 11 | 6AU6 | 470KΩ | 0Ω | .1Ω | 0Ω | †3.3KΩ | †24KΩ | 0Ω | | |
| V 12 | ▯AL5 | 200KΩ | 100KΩ | .1Ω | 2.7Ω | 0Ω | 0Ω | 100KΩ | | |
| V 13 | 6AV6 | 10 Meg. | 0Ω | .1Ω | 0Ω | Inf. | Inf. | †270KΩ | | |
| V 14 | 6K6GT | Inf. | .1Ω | †2.2KΩ | †1.8KΩ | 470KΩ | Inf. | 0Ω | 470Ω | |
| V 15 | 6SN7GT | 2.6 Meg. | †3.5 Meg. | 0Ω | 1 Meg. | †2.5KΩ | 0Ω | 0Ω | .1Ω | |
| V 16 | 6K6GT | 5KΩ | .1Ω | †15KΩ | †15KΩ | 3.3 Meg. | Inf. | 0Ω | 7.2KΩ | |
| V 17 | 6SN7GT | 900KΩ | †60KΩ | 270KΩ | 250KΩ | †100KΩ | 0Ω | 0Ω | .1Ω | |
| V 18 | 6BG6G | Inf. | .1Ω | 82Ω | †10KΩ | 1 Meg. | 1 Meg. | 0Ω | †10KΩ | TOP CAP †3KΩ |
| V 19 | 6W4GT | Inf. | Inf. | †3KΩ | Inf. | †60Ω | 1 Meg. | 0Ω | .1Ω | |
| V 20 | 1B3GT | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP †3KΩ |
| V 21 | 5U4G | Inf. | 12KΩ | Inf. | 20Ω | Inf. | 23Ω | Inf. | 12KΩ | |
| V 22 | 12LP4A | 0Ω | 1.1 Meg. | PIN 10 †22KΩ | PIN 11 55KΩ | PIN 12 .1Ω | | | | |

† MEASURED FROM PIN 2 OF V21.

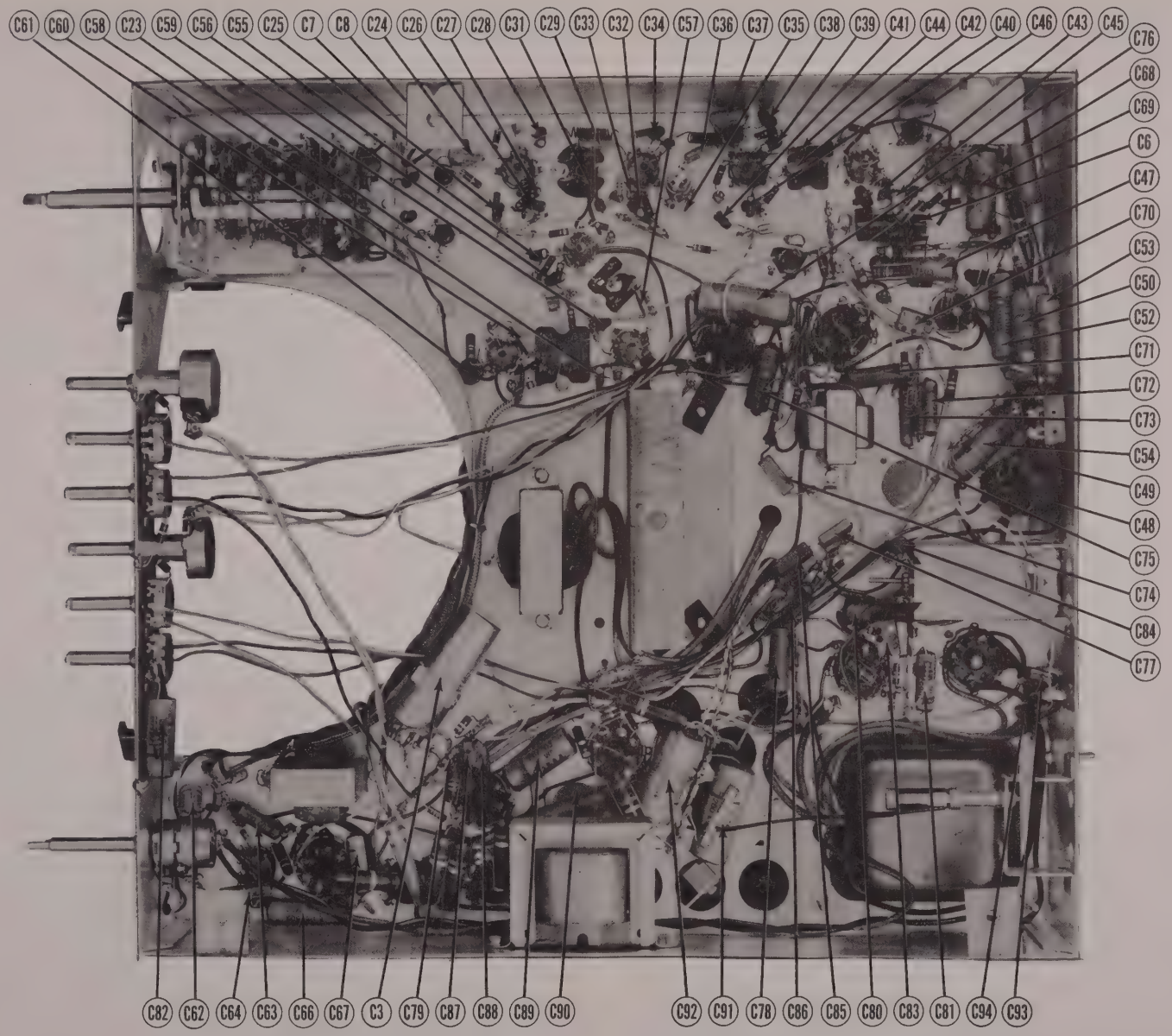
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



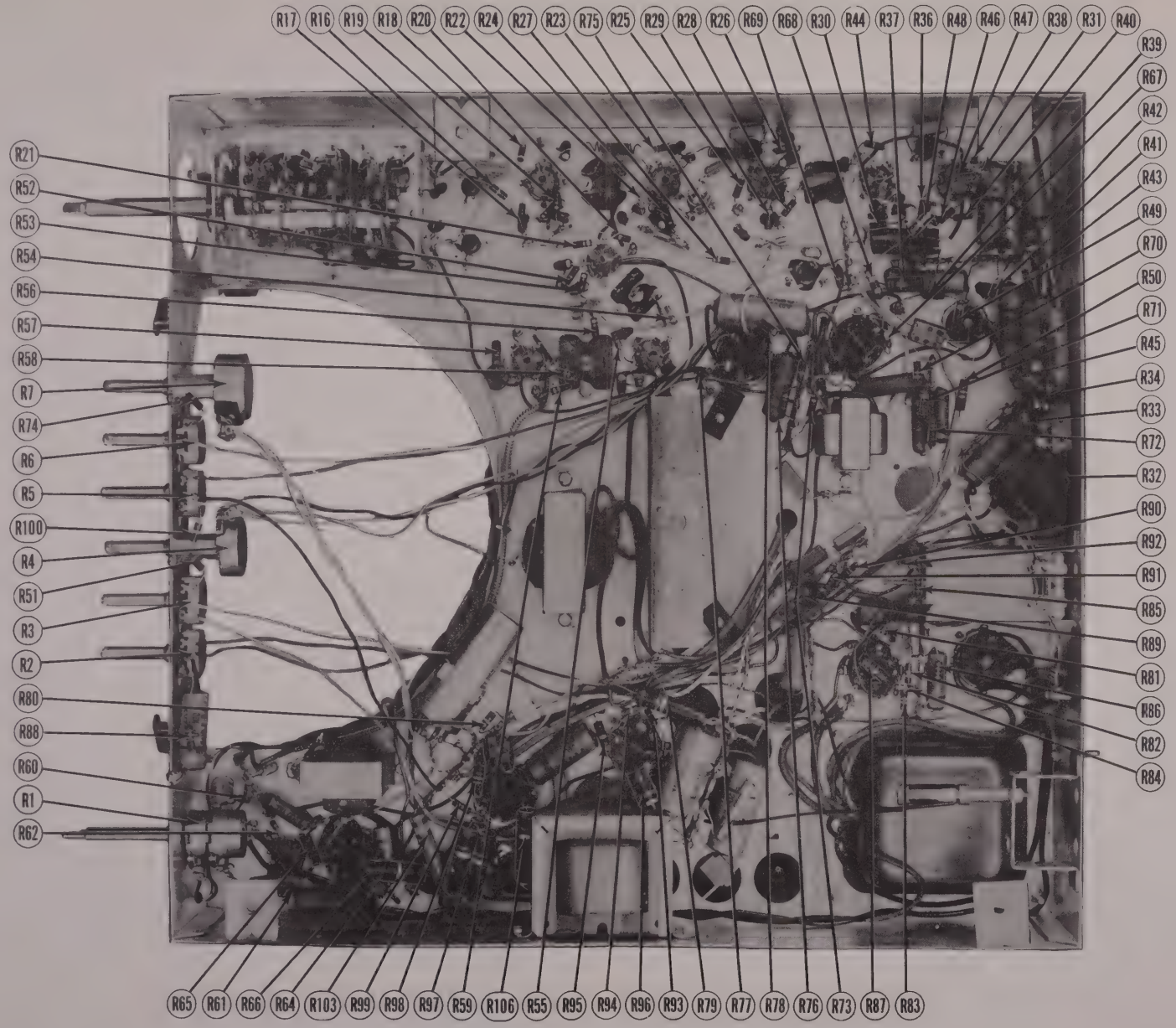

RF TUNER-RIGHT SIDE



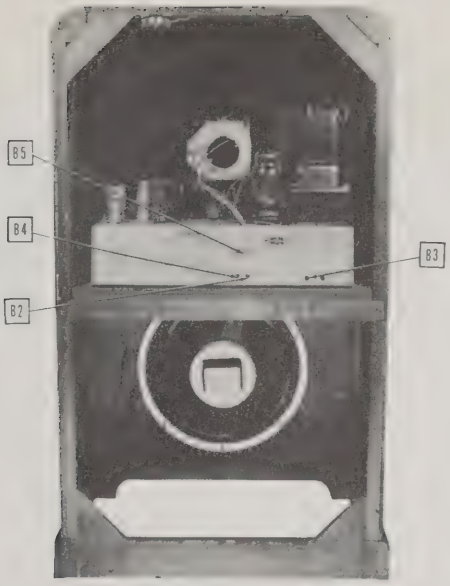

RF TUNER-LEFT SIDE




CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




CABINET-REAR VIEW

# HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL FREQUENCY ADJUSTMENT

Connect a jumper across terminals "C" and "D" of the horizontal oscillator transformer L28. Tune in a station and, if possible, sync the picture and proceed as follows:

1. Turn horizontal hold control fully clockwise. Adjust the Frequency Adjustment (B1) so picture is just out of sync and the horizontal blanking appears as a vertical bar.
2. Turn the hold control approximately a quarter of a turn from the fully clockwise position and notice the picture width and linearity. If the width and linearity is incorrect, adjust the horizontal drive (B2) and size (B3) controls until the picture is correct. If B2 and B3 require adjustment repeat step 1 above.

HORIZONTAL LOCKING RANGE ADJUSTMENT

Turn the horizontal hold control fully counterclockwise. Remove signal momentarily by turning channel switch to another channel and back again. Slowly turn the hold control clockwise and note the number of diagonal bars that appear just before the picture "syncs".

If more than $4\frac{1}{2}$ bars are present just before synchronization, turn the horizontal locking range trimmer (B4) slightly clockwise. If less than $3\frac{1}{2}$ bars are present, turn B4 slightly counterclockwise.

Turn the hold control counterclockwise and momentarily interrupt the signal and check the number of bars present at the pull-in point. Repeat this procedure until $3\frac{1}{2}$ to $4\frac{1}{2}$ bars are present.

HORIZONTAL OSCILLATOR WAVEFORM ADJUSTMENT

Remove the jumper across terminals "C" and "D" of L28.

Turn the horizontal hold control fully clockwise. Adjust B5 with a non-metallic screwdriver until the horizontal blanking bar is present on the raster.

Connect the low capacity probe of an oscilloscope to terminal "C" of L28. Turn the horizontal hold control one quarter of a turn from the clockwise position until the picture "syncs". The pattern on the scope should be similar to Fig. 7 . Adjust B5 until the broad and narrow peaks are of the same amplitude (If necessary, while making this adjustment turn the hold control to keep the picture in synchronization).

This adjustment must be carefully made to assure correct circuit operation. If the broad peak is lower in amplitude than the sharp peak, the oscillator drift becomes greater and the circuit has great susceptibility to noise pluses. However, if the broad peak is greater in amplitude than the sharp peak, the oscillator is overstabilized, the pull-in range inadequate , and there is the possibility of double triggering of the oscillator as the horizontal hold control approaches the extreme clockwise position.

HORIZONTAL OSCILLATOR ADJUSTMENTS CHECK

Turn the horizontal hold control fully counterclockwise. Momentarily remove the signal and then slowly turn the hold control clockwise and note the number of bars present just before the picture synchronizes.

If more than $4\frac{1}{2}$ bars are present, turn B4 slightly clockwise. If less than 3 bars are present, turn B4 slightly counterclockwise. Momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until $4\frac{1}{2}$ bars are present just before synchronization occurs.

Turn the horizontal hold control fully clockwise. The picture should be just out of synchronization to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Retouch B1 until this condition exists.

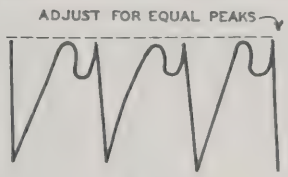



FIG.7

# DISASSEMBLY INSTRUCTIONS

1. Remove four knobs from front of cabinet.
2. Remove six screws holding rear cover in place.
3. Disconnect power line, remove rear cover.
4. Disconnect built-in antenna.
5. Disconnect two speaker leads.
6. Remove four hex head bolts holding set in cabinet.
7. Remove set from cabinet.
8. Remove four 5/16" hex nuts from speaker.
9. Remove speaker from cabinet.

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: STANDARD REPLACEMENT | RMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | RF Amp. | 6AG5 | 6AG5 | 7BD | |
| V2 | Converter | 6J6 | 6J6 | 7BF | |
| V3 | 1st Video IF | 6AG5 | 6AG5 | 7BD | |
| V4 | 2nd Video IF | 6AG5 | 6AG5 | 7BD | |
| V5 | 3rd Video IF | 6AG5 | 6AG5 | 7BD | |
| V6 | Video Det.-DC Rest. | 6AL5 | 6AL5 | 6BT | |
| V7 | 1st Video Amp.-1st Sync. Amp. | 12AT7 | 12AT7 | 9A | |
| V8 | AGC Keying | 6AU6 | 6AU6 | 7BK | |
| V9 | 2nd Video Amp.-Sync. Sep. | 12AU7 | 12AU7 | 9A | |
| V10 | Sound IF Amp. | 6BA6 | 6AU6 | 7BK | |
| V11 | Limiter | 6AU6 | 6AU6 | 7BK | |
| V12 | Disc. | 6AL5 | 6AL5 | 6BT | |
| V13 | AF Amp. | 6AV6 | 6AV6 | 7BT | |
| V14 | Audio Output | 6K6GT | 6K6GT | 7S | |
| V15 | 2nd Sync. Amp.-Vert. Osc. | 6SN7GT | 6SN7GT | 8BD | |
| V16 | Vert. Output | 6K6GT | 6K6GT | 7S | |
| V17 | Bor. AFC-Bor. Osc. | 6SN7GT | 6SN7GT | 8BD | |
| V18 | Hor. Output | 6BG6G | 6BG6G | 5BT | |
| V19 | Damper | 6W4GT | 6W4GT | 4CG | |
| V20 | HV Rect. | 1B3GT | 1B3GT | 3C | |
| V21 | LV Rect. | 5U4G | 5U4G | 5T | |
| V22 | Picture Tube | 12LP4A | 12LP4A | 12D | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 80 | 450 | 45X376 | AF888J | | UP8445 | | TVL-2777 | ▲ Filter |
| B | 30 | 450 | | | | | | | ▲ Filter |
| C2A | 80 | 450 | 45X376 | AF888J | | UP8445 | | TVL-2777 | ▲ Filter |
| B | 30 | 450 | | | | | | | ▲ Filter |
| C3A | 10 | 450 | 45X375 | AF22J | | UP5CJ879 | | TVL-3749 | ■ Output Dec. |
| B | 10 | 450 | | PRS50/50 | | | | | ▲ Vert. Output Decoup. Output Cath. Byp. |
| C | 40 | 50 | | | | | | | |
| C4A | 10 | 450 | 45X375 | AF22J | | UP5CJ879 | | TVL-3749 | ■ Decoupling |
| B | 10 | 450 | | PRS50/50 | | | | | ▲ Vert. Output Decoup. Vert. Output Cath. |
| C | 40 | 50 | | | | | | | Filter * |
| C5 | 30 | 450 | 47X379 | PRS450/30 | | BR3045A | | TVA-23 | lst Sync. Amp. Cath. |
| C6 | 10 | 25 | | PRS25/10 | | BR102A | | TVA-1204 | RF Plate Dec. |
| C7 | 1000 | | | GP1000M | D6-102 | | GP2L-001 | | Ant. Coupling |
| C8 | 1000 | | | GP1000M | D6-102 | | GP2L-001 | | Ant. Coupling |
| C9 | 15 | | | GP15K | D6-150 | | GP1K-15 | | RF Coupling |
| C10 | 1000 | | | GP1000M | D6-102 | | GP2L-001 | | AGC Filter |
| C11 | 680 | | | GP680M | D6-681 | | GP2K-680 | | RF Screen Byp. |
| C12 | 680 | | | GP680M | D6-681 | | GP2K-680 | | RF Bypass |
| C13 | .25 | | | | | | | | RF Coupling |
| C14 | .5 | | | | D2-.5 | | | | RF Coupling |
| C15 | 2.2 | | | | D2-2.2 | | | | RF Coupling |
| C16 | 470 | | | GP470M | D6-471 | | GP2K-470 | | RF Plate Dec. |
| C17 | 470 | | | GP470M | D6-471 | | GP2K-470 | | Conv. Grid Filter |
| C18 | 10 | | | CN10FNPO | D2-10 | | NPOK-10 | | Osc. Grid Cap. |
| C19 | 3 | | | CI3DN750 | | | N750K-3 | | Osc. Feedback |
| C20 | 680 | | | GP680M | D6-681 | | GP2K-680 | | Filament Bypass |
| C21 | 10 | | | CN10FNPO | D2-10 | | NPOK-10 | | Fixed Trimmer |
| C22 | 1000 | | | GP1000M | D6-102 | | GP2L-001 | | Filament Bypass |
| C23 | 68 | | 47X501 | CN68KN750 | DN-68 | | N750L-68 | | Fixed Trimmer |
| C24 | 270 | 500 | 47X445 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | IF Coupling |
| C25 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | AGC Filter |
| C26 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | RF Bypass |
| C27 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | lst V. IF Decoup. |
| C28 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | lst V. IF Fil. Byp. |
| C29 | 270 | 500 | 47X445 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | IF Coupling |
| C30 | 47 | | | CN47JNPO | D2-470 | 5R5Q5 | NPOL-47 | MS-45 | Fixed Trimmer |
| C31 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | AGC Filter |
| C32 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | RF Bypass |
| C33 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 2nd V. IF Decoup. |
| C34 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 2nd V. IF Fil. Byp. |
| C35 | 75 | | | CN75JN750 | DN-75 | | N750L-75 | | Fixed Trimmer |
| C36 | 270 | 500 | 47X445 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | IF Coupling |
| C37 | 47 | 500 | 47X565 | 1469-00005 | D2-47 | 5R5Q5 | NPOM-50 | MS-45 | Fixed Trimmer |
| C38 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 3rd V. IF Cath. |
| C39 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 3rd V. IF Fil. |
| C40 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | 3rd V. IF Dec. |
| C41 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | RF Bypass |
| C42 | 270 | 500 | 47X445 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | IF Coupling |
| C43 | 5 | | 47X562 | GP5K | D2-4.7 | 5W5V5 | GP1K-5 | MS-55 | V. Diode Filter |
| C44 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | V. Det. Fil. Byp. |
| C45 | 43 | | 47X563 | CN43JN030 | | | N030K-43 | | Peaking |
| C46 | 360 | 500 | 47X568 | 1469-00035 | | | | | Fixed Trimmer |
| C47 | .05 | 400 | D67503 | P488-05 | | PTE4S5 | | TM-15 | Video Coupling |
| C48 | 1000 | 500 | 47X569 | 1468-001 | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Hor. Feedback |
| C49 | .1 | 200 | B65104 | P288-1 | | PTE4P1 | | TM-1 | AGC Filter |
| C50 | .5 | 200 | B65504 | P288-5 | | GT2P5 | | TC-5 | AGC Filter |
| C51 | .5 | 200 | B65504 | P288-5 | | GT2P5 | | TC-5 | AGC Filter * |
| C52 | .1 | 600 | F65104 | P688-1 | | PTE6P1 | | TM-1 | Video Coupling |
| C53 | .05 | 400 | D67503 | P488-05 | | PTE4S5 | | TM-15 | Video Coupling |
| C54 | .1 | 200 | B65104 | P288-1 | | PTE4P1 | | TM-1 | Pic. Tube Cath. Byp. |
| C55 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | S. IF Cath. Byp. |
| C56 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | S. IF Dec. |
| C57 | 5000 | | 47X507 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Limiter Grid Filter |
| C58 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Limiter Screen |
| C59 | 1000 | | 47X519 | GP1000M | D6-102 | 1W5D1 | GP2L-001 | 1FM-21 | Limiter Plate Dec. |
| C60 | 270 | 500 | 47X445 | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | RF Bypass |
| C61 | 5000 | | 47X507 | BPD-5 | D6-502 | 1D5D5 | 811-005 | 29C1 | Disc. Fil. Byp. |

## CAPACITORS (CONT.)

| ITEM No. | RATING: CAP. | RATING: VOLT | REPLACEMENT DATA: TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C62 | .05 | 200 | D67503 | P288-05 | | PTE4S5 | | TM-15 | Audio Coupling |
| C63 | .005 | 200 | B65502 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Tone Compensation |
| C64 | .01 | 200 | B65103 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C65 | .05 | 400 | D67503 | P488-05 | | | | TM-15 | AF Amp. Plate Dec. * |
| C66 | .05 | 400 | D67503 | P488-05 | | | | TM-15 | Audio Coupling |
| C67 | .005 | 600 | F65502 | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Output Plate Byp. |
| C68 | .05 | 400 | D67503 | P488-05 | | | | TM-15 | Sync. Coupling |
| C69 | .1 | 400 | D65104 | P488-1 | | | | TM-1 | Sync. Coupling |
| C70 | 100 | 500 | 47X526 | 1468-0001 | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Sync. Coupling |
| C71 | .002 | 200 | B65202 | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Integrator Net. |
| C72 | .005 | 200 | B65502 | P688-005 | D6-502 | PTE6D5 | GP2M-005 | TM-25 | Integrator Net. |
| C73 | .005 | 200 | B65502 | P688-005 | D6-502 | PTE6D5 | GP2M-005 | TM-25 | Integrator Net. |
| C74 | 4700 | 500 | 47X543 | 1464-005 | D6-472 | 1D5D5 | GP2M-0047 | 1FM-25 | Vert. Osc. Grid |
| C75 | .03 | 400 | F65303 | P488-03 | | PTE4S3 | | TM-13 | Vert. Discharge |
| C76 | 25 | 400 | D65254 | P488-25 | | GT4P25 | | TC-2 | Vert. Sweep Coupling |
| C77 | 180 | 500 | 47X564 | 1469-0002 | D6-181 | 5R5T2 | GP2K-180 | MS-32 | Hor. Sync. Coupling |
| C78 | .002 | 600 | F67202 | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Hor. Sync. Coupling |
| C79 | 5 | 1500 | 47X533 | | | | | | Hor. Feedback |
| C80 | .25 | 200 | B65254 | P488-25 | | GT2P25 | | TC-2 | AFC Filter |
| C81 | .02 | 200 | B65203 | P488-02 | | PTE4S2 | | TM-12 | AFC Filter |
| C82 | .05 | 600 | F67503 | P688-05 | | PTE6S5 | | TM-15 | Hor. AFC Plate |
| C83 | 220 | 500 | 47X573 | 1468-00025 | D6-221 | 5W5T25 | GP2K-220 | 1FM-325 | Hor. Osc. Grid Cap. |
| C84 | .01 | 200 | B64103 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Fixed Trimmer |
| C85 | 1600 | 500 | 47X567 | | | | | | Hor. Discharge |
| C86 | 680 | 500 | 47X566 | GP680K | D6-681 | 1W5T7 | GP2K-680 | 1FM-37 | Hor. Sweep Coupling |
| C87 | 24 | 500 | | 1469-000025 | D2-24 | 5R5Q25 | NPOL-25 | MS-425 | Hor. Feedback |
| C88 | 24 | 500 | | 1469-000025 | D2-24 | 5R5Q25 | NPOL-25 | MS-425 | Hor. Feedback |
| C89 | .05 | 600 | F67503 | P688-05 | | PTE6S5 | | TM-15 | Hor. Output Screen |
| C90 | .25 | 200 | B65254 | P488-25 | | GT2P25 | | TC-2 | Hor. Output Cath. |
| C91 | .5 | 200 | B65504 | P288-5 | | GT2P5 | | TC-5 | Damper Filter |
| C92 | .5 | 200 | B66504 | P288-5 | | GT2P5 | | TC-5 | Hor. Sweep Coupling |
| C93 | .01 | 400 | 46X410 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Line Filter |
| C94 | .01 | 400 | 46X410 | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Line Filter |
| C95 | 500 | 20000 | 47X560 | | TV3-502 | | | | HV Filter |

* Not used in all models.

## CONTROLS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: IRC PART No. | REPLACEMENT DATA: CLAROSTAT PART No. | REPLACEMENT DATA: CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | 3000Ω | ½ | | Concentrikit | | | Contrast control-front |
| B | 1 Meg. | ½ | | B11-112 | | | Volume control tapped at 200KΩ-rear |
| C | Shaft End | | 78X4 | B13-137X | | SBBT-503-S | Attach per instructions in "Concentrikit" |
| D | Switch | | | E-202 * | | | Attach per instructions in "Concentrikit" |
| R2A | 50KΩ | ½ | | 76-1 * | | | Horiz. hold control |
| B | Shaft | | 40X299 | Q11-123 | AM-44-S | B-31 | Attach to R2A per instructions |
| R3A | 500KΩ | ½ | Not Req. | Not Req. | KSS-3 | Not Req. | Brightness control |
| B | Shaft | | 40X297 | Q11-133 | AM-58-S | B-59 | Attach to R3A per instructions |
| R4A | 5000Ω | ½ | Not Req. | Not Req. | KSS-3 | Not Req. | Vert. linearity control |
| B | Sleeve | | 40X294 | Q11-114 | | | |
| | Bushing | | Not Req. | S-3 † | | | Height control |
| R5A | 2.5 Meg. | ½ | 40X293 | Q11-239 | AM-84-S | B-83 | Attach to R5A per instructions |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | Not Req. | Vert. hold control |
| R6A | 1 Meg. | ½ | 40X298 | Q11-137 | AM-61-S | B-69 | Attach to R6A per instructions |
| B | Shaft | | Not Req. | Not Req. | KSS-3 | Not Req. | Focus control-Wire Wound |
| R7 | 6500Ω | 2 | 40X302 | | | SV-914 | |

* Additional parts to be used with "Concentrikit"

† Attach S3 sleeve bushing and cut to same length as original.

## RESISTORS

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES: ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED. |
|---|---|---|---|---|---|
| R8 | 22000Ω 20% | ½ | B85222 | BTS-2200 | RF Amp. Grid |
| R9 | 4700Ω | ½ | B84472 | BTS-4700 | RF Amp. Screen |
| R10 | 22KΩ 20% | ½ | B85223 | | Osc. Grid |
| R11 | 4700Ω | ½ | B84472 | BTS-4700 | Osc. Plate |
| R12 | 270KΩ 20% | ½ | B85274 | | Conv. Grid |
| R13 | 56000 5% | 1 | C83562 | | Conv. Plate |
| R14 | 1000Ω | ½ | B84102 | BTS-1000 | Antenna Isolation |
| R15 | 1000Ω | ½ | B84102 | BTS-1000 | Antenna Isolation |
| R16 | 1000Ω | ½ | B84102 | BTS-1000 | AGC Network |
| R17 | 56000 5% | ½ | C83562 | | lst Video IF Amp. Grid |
| R18 | 470 5% | ½ | B83470 | | lst Video IF Amp. Cathode |
| R19 | 1000Ω | ½ | B84102 | BTS-1000 | lst Video IF Amp. Decoupling |
| R20 | 150Ω | ½ | B84151 | | Decoupling |
| R21 | 1000Ω | ½ | B84102 | BTS-1000 | AGC Network |
| R22 | 8200Ω | ½ | B83822 | | 2nd Video IF Amp. Grid |
| R23 | 330Ω 5% | ½ | B83330 | | 2nd Video IF Amp. Cathode |
| R24 | 1000Ω | ½ | B84102 | BTS-1000 | 2nd Video IF Amp. Decoupling |
| R25 | 12KΩ | ½ | B83123 | | 3rd Video IF Grid |
| R26 | 150Ω | ½ | B84150 | | 3rd Video IF Cathode |
| R27 | 330Ω 20% | ½ | B85331 | | Decoupling |
| R28 | 22KΩ 20% | ½ | B85223 | | 3rd Video IF Amp. Plate |
| R29 | 2200Ω | ½ | B84222 | BTS-2200 | 3rd Video IF Amp. Decoupling |
| R30 | 4700Ω 5% | ½ | B83472 | BTS-4700-5% | Video Det. Diode Load |
| R31 | 33KΩ | ½ | B84333 | BTS-33K | AGC Keying Grid |
| R32 | 22KΩ | ½ | B84223 | BTS-22K | AGC Network |
| R33 | 820KΩ | ½ | B84824 | BTS-820K | AGC Network |
| R34 | 100KΩ | ½ | B84104 | BTS-100K | AGC Network-See Note 1 |
| R35 | 150KΩ | ½ | B84154 | BTS-150K | AGC Filter-See Note 2 |
| R36 | 5600Ω | 1 | C84562 | BTA-5600 | lst Video Amp. Plate |
| R37 | 2700Ω | 1 | C84272 | BTA-2700 | lst Video Amp. Plate |
| R38 | 10KΩ | ½ | B84103 | BTS-10K | Isolation |
| R39 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | lst Sync. Amp. Grid |
| R40 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | 2nd Video Amp. Grid |
| R41 | 100Ω | ½ | B84101 | BW-½-100 | 2nd Video Amp. Cathode |

## RESISTORS (CONT.)

| ITEM No. | RATING: RESISTANCE | RATING: WATTS | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R42 | 3900Ω | 1 | C83392 | BTA-3900 | 2nd Video Amp. Plate |
| R43 | 10KΩ | ½ | B84103 | BTS-10K | Isolation |
| R44 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | DC Rest. Diode Load |
| R45 | 100KΩ 20% | ½ | B85104 | BTS-100K | Picture Tube Grid |
| R46 | 22KΩ 20% | ½ | B85223 | BTS-22K | lst Sync. Amp. Cathode |
| R47 | 8200Ω | ½ | B84822 | BTS-8200 | Voltage Divider |
| R48 | 22KΩ | 1 | C84223 | BTA-22K | lst Sync. Amp. Plate |
| R49 | 2200Ω | ½ | B84222 | BTS-2200 | lst Sync. Amp. Coupling |
| R50 | 68KΩ | ½ | B84683 | BTA-68K | lst Sync. Sep. Plate |
| R51 | 100KΩ 20% | ½ | B85104 | BTS-100K | Voltage Divider |
| R52 | 82Ω | ½ | B84820 | | Sound IF Amp. Cathode |
| R53 | 1000Ω | ½ | B84102 | BTS-1000 | Sound IF Amp. Decoupling |
| R54 | 470KΩ 20% | ½ | B85474 | | Limiter Grid |
| R55 | 22KΩ 5% | ½ | B83223 | | Limiter Screen |
| R56 | 1000Ω | ½ | B84102 | BTS-1000 | Limiter Plate Decoupling |
| R57 | 5.1Ω | 1 | 43X239 | | Disc. Filament-Wire Wound |
| R58 | 100KΩ | ½ | B84104 | BTS-100K | Disc. Diode Load |
| R59 | 100KΩ | ½ | B84104 | BTS-100K | Disc. Diode Load |
| R60 | 68KΩ | ½ | B84683 | BTS-68K | Tone Compensation |
| R61 | 10 Meg. 20% | ½ | B85106 | BTS-10 Meg. | AF Amp. Grid |
| R62 | 270KΩ | ½ | B84274 | BTS-270K | AF Amp. Plate |
| R63 | 47KΩ | ½ | B84473 | BTS-47K | AF Amp. Plate Decoupling-See Note 2 |
| R64 | 470KΩ 20% | ½ | B85474 | BTS-470K | Audio Output Grid |
| R65 | 470Ω | 1 | C84471 | BTA-470 | Audio Output Cathode |
| R66 | 1000Ω | 2 | D84102 | BT-2-1000 | Audio Output Plate Decoupling |
| R67 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | 2nd Sync. Amp. Grid |
| R68 | 330Ω | ½ | B84330 | BW-½-330 | 2nd Sync. Amp. Plate |
| R69 | 680Ω | ½ | B84680 | BTS-680 | 2nd Sync. Amp. Plate |
| R70 | 22KΩ | ½ | B84223 | BTS-22K | Integrator |
| R71 | 8200Ω | ½ | B84822 | BTS-8200 | Integrator |
| R72 | 8200Ω | ½ | B84822 | BTS-8200 | Integrator |
| R73 | 1.5 Meg. | ½ | B84155 | BTS-1.5 Meg. | Vert. Osc. Grid |
| R74 | 100KΩ 20% | ½ | B85104 | BTS-100K | Voltage Divider |
| R75 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | Vert. Osc. Plate |
| R76 | 8200Ω | ½ | B84822 | BTS-8200 | Vert. Peaking |
| R77 | 3.3 Meg. 20% | ½ | B85335 | BTS-3.3 Meg. | Vert. Output Grid |
| R78 | 2200Ω | ½ | B84222 | BTS-2200 | Vert. Output Cathode |
| R79 | 10KΩ | 2 | B84103 | BT-2-10K | Vert. Output Decoupling |
| R80 | 560KΩ | ½ | B84564 | BTS-560K | Feedback |
| R81 | 820KΩ | ½ | B84824 | BTS-820K | Horiz. AFC Grid |
| R82 | 150KΩ | ½ | B84154 | BTS-150K | Horiz. AFC Cathode |
| R83 | 150KΩ | ½ | B84154 | BTS-150K | Voltage Divider Network |
| R84 | 100KΩ 5% | ½ | B83104 | BTS-100K-5% | Horiz. Osc. Grid |
| R85 | 8200Ω | ½ | B84822 | BTS-8200 | Horiz. Osc. Transformer Shunt |
| R86 | 8200Ω | ½ | B84822 | BTS-8200 | Horiz. AFC Filter Network |
| R87 | 2.7 Meg. | 1 | | BTA-2.7 Meg. | Voltage Divider |
| R88 | 68KΩ | ½ | B84683 | BTS-68K | Voltage Divider Network |
| R89 | 120KΩ | ½ | B84124 | BTS-120K | Voltage Divider Network |
| R90 | 150KΩ | ½ | B84154 | BTS-150K | Horiz. Filter Network |
| R91 | 82KΩ | ½ | B84823 | BTS-82K | Horiz. Osc. Plate |
| R92 | 22KΩ | ½ | B84223 | BTS-22K | Horiz. Osc. Transformer Shunt |
| R93 | 1 Meg. | ½ | B84105 | BTS-1 Meg. | Horiz. Output Grid |
| R94 | 150Ω | ½ | B84151 | | Parasitic Suppressor |
| R95 | 82Ω | 2 | | BW-½-82 | Horiz. Output Cathode-Wire Wound |
| R96 | 10KΩ | 2 | D84103 | BT-2-10K | Horiz. Output Screen |
| R97 | 3300Ω | 5 | | | Filter-See Note 3 |
| R98 | 18KΩ | ½ | C84183 | BTA-18K | Voltage Divider |
| R99 | 56KΩ | ½ | B84563 | BTS-56K | Decoupling |
| R100 | 470KΩ 20% | ½ | B85474 | BTS-470K | Voltage Divider |
| R101 | 1Ω 5% | | | | HV Rect. Filament |
| R102 | 1 Meg. 20% | 1 | C85105 | | HV Filter |
| R103 | 680Ω | 2 | D84681 | BT-2-680 | Focus Coil Shunt |
| R104 | 500Ω | 10 | 43X345 | AB-500 | Filter-Wire Wound |
| R105 | 1500Ω | 10 | 43X246 | AB-1500 | Filter-Wire Wound |
| R106 | 10KΩ | 2 | D84103 | BT-2-10K | Bleeder |
| R107 | 270KΩ | ½ | B84274 | BTS-270K | Sync. Sep. Cathode-See Note 4 |

Note 1. Some models use a 220KΩ resistor in this application.
Note 2. Not used in all models.
Note 3. Some models use three 10KΩ 2 watt resistor in parallel to obtain required resistance and wattage.
Note 4. Some models use a 47KΩ resistor in this application.

## TRANSFORMER (POWER)

| ITEM No. | RATING: PRI. | RATING: SEC. 1 | RATING: SEC. 2 | RATING: SEC. 3 | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: STANCOR PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: CHICAGO PART No. |
|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC ② 1.9A | 720VCT 220ADC ② 3A | 5VAC ② 3A | 6.3VAC ② 8.5A | 53X298 | P-8159 | P-3063 ① | TP-355 |

① Drill new mounting holes.

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING: DC RESISTANCE PRI. | RATING: DC RESISTANCE SEC. | REPLACEMENT DATA: TRUETONE PART No. | REPLACEMENT DATA: STANCOR PART No. | REPLACEMENT DATA: MERIT PART No. | REPLACEMENT DATA: CHICAGO PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| T2 | 175Ω | 1300Ω | 54X5 | A-8111 ② | A-3000 ② | TBO-2 ② | Vert. Block Osc. Trans. |
| T3 | 335Ω Tap ② .4Ω, 45Ω | 3Ω Tap ② 2.8Ω SEC. 2 | 53X301 | | | | Hor. Output Trans. |
| T4 | 1300Ω | 10Ω | 51X147 | A-8112 | A-3036 | TSO-5 ② | Vert. Output Trans. |
| T5A | 14Ω | | 9A2069 | DY-7 | MD-3 | | Hor. Deflection Coil |
| B | 61Ω | | | | | | Vert. Deflection Coil |
| T6 | 380Ω | | 9A2083 | FC-10 | MF-3 | | Focus Coil |

② Drill one new mounting hole.

TRUETONE MODEL 2D1088A

# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | TRUETONE PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | |
| T7 | 7100Ω | 4.2Ω | 450Ω | .5Ω | 51X146 | A-3878 | A-2931 | RO-13 | |

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|---|
| | FIELD RES. | V. C. IMP. | TRUETONE PART No. | JENSEN PART No. | QUAM PART No. | |
| SP1 | PM | 4.2Ω | 12A490 | ST-102 ③ MOD. P12-S | 12A4A | ③ Replace output transformer to match 6-8Ω voice coil. |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2 | 11 1/2" | 1" | | | | |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | TOTAL DIRECT CURRENT | D. C. RESISTANCE | INDUCTANCE (0 CURRENT 1000 ∽) | TRUETONE PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| L1 | .220ADC | 51Ω | 2 Henry | 52X88 | C-2326 | C-2991 | TR-3300② | ② Drill one new mounting hole. |

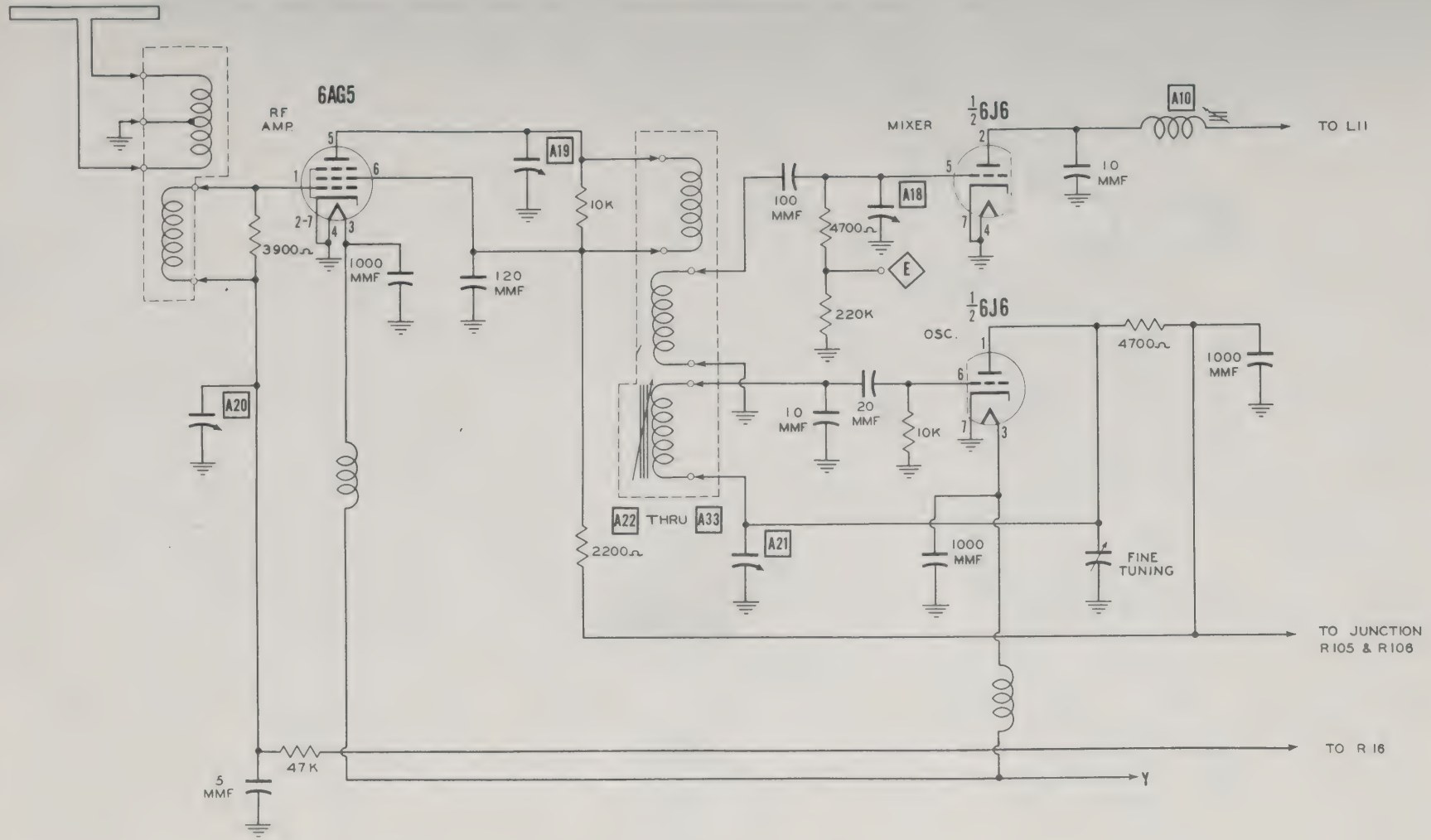
## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | | PRI. | SEC. | TRUETONE PART No. | MEISSNER PART No. | |
| L2 | Ant. Coil | 0Ω | | | | Part of tuner. |
| L3 | Ant. Coil | 0Ω | | | | Part of tuner. |
| L4 | RF Coil | 0Ω | | | | Part of tuner. |
| L5 | Osc. Coil | 0Ω | | | | Channel 6, part of tuner. |
| L6 | Osc. Coil | 0Ω | | | | Channel 13, part of tuner. |
| L7 | 1st Video IF | 0Ω | | | | Part of tuner. |
| L8 | Fil. Choke | .5Ω | | | | Part of tuner. |
| L9 | Fil. Choke | 0Ω | | 9A2033 | | |
| L10 | Conv. Plate | .1Ω | | 9A2059 | | |
| L11 | 1st Video IF Coupling | .1Ω | | 9A2072 | | |
| L12 | Fil. Choke | 0Ω | | 9A2033 | | |
| L13 | 2nd Video IF -Sound Take Off | .2Ω | 0Ω | 9A2076 | | |
| L14 | Fil. Choke | 0Ω | | 9A2033 | | |
| L15 | 3rd Video IF | .2Ω | .1Ω | 9A2055 | | |
| L16 | Sound Trap | .1Ω | .1Ω | 9A2073 | | |
| L17 | Fil. Choke | 0Ω | | 9A2033 | | |
| L18 | RF Choke | 2.8Ω | | 9A1979 | | |
| L19 | 4th Video IF | .2Ω | | 9A2071 | | |
| L20 | Peaking | 11.5Ω | | 9A2090 | 19-1923 | Green dot, 390 microhenries |
| L21 | Peaking | 5.2Ω | | 9A2086 | 19-1920 ‡ | Wound on 4.7KΩ resistor, 95 microhenries, Yellow dot. |
| L22 | Peaking | 8Ω | | 9A2088 | 19-1922 | Blue dot, 196 microhenries |
| L23 | 4.5MC Trap | .4Ω | | 9A2074 | | |
| L24 | Peaking | 7Ω | | 9A2089 | 19-1921 † | Wound on 2.2KΩ resistor, red dot, 183 microhenries |
| L25 | Peaking | 6.2Ω | | 9A2087 | 19-1921 | White dot, 125 microhenries |
| L26 | Sound IF | .2Ω | .2Ω | 9A1986 | | |
| L27 | Disc. Trans. | .2Ω | .2Ω | 9A2049 | | |
| L28 | Horiz. Osc. Trans. | 150Ω | 47Ω | 9A2096 | | |
| L29 | Horiz. Size | .2Ω | | 9A2075 | | Not used in all sets. |

† Parallel with 2.2KΩ resistor.
‡ Parallel with 4.7KΩ resistor.

## MISCELLANEOUS

| ITEM No. | PART NAME | TRUETONE PART No. | NOTES |
|---|---|---|---|
| M1A | RF Tuner | 25A1066 | Switch Type, order by number stamped on tuner |
| B | RF Tuner | 25A1074 | Switch Type, order by number stamped on tuner |
| C | RF Tuner | 25A1070 | Turret Type, order by number stamped on tuner |
| M2 | Fuse | 16X133 | .25A 250V Type MDV |
| M3 | Ion Trap | 2A401 | |
| | Trimmer | 17A260-A | Dual trimmer(horiz. drive, horiz. frequency) |
| | Safety Glass | 17X112 | |
| | Escutcheon | 4X1065 | Channel selector |
| | Escutcheon | 4X1029 | Volume and contrast |
| | Knob | 10A741 | Channel selector |
| | Knob | 10A742 | Fine tuning |
| | Knob | 10A752 | Contrast |
| | Knob | 10A753 | Volume |
| | Cover | 4X1072 | Front panel |

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# ALTERNATE TUNER

WEBSTER-CHICAGO
MODELS 362, 762

MODEL 362

MODEL 762

WEBSTER-CHICAGO
MODELS 362, 762

| | |
|---|---|
| TRADE NAME | Webster-Chicago, Models 362, 762 |
| MANUFACTURER | Webster-Chicago, 5610 Bloomington Ave., Chicago 39, Illinois |
| TYPE SET | AC Operated Phono Player with Three Tube Amplifier |
| TUBES (THREE) | Types 12SJ7 AF Amp., 50L6GT Power Output, 35Z5GT Rectifier |
| POWER SUPPLY | 110-120 Volts AC RATING .23 Amp. at 117 Volts AC |

RECORD CHANGER --- WEBSTER-CHICAGO MODEL 77-1 USED IN MODEL 762
RECORD CHANGER --- WEBSTER-CHICAGO MODEL 346 USED IN MODEL 362.
FOR SERVICE INFORMATION ON WEBSTER-CHICAGO MODEL 346 SEE PHOTOFACT SET 100 FOLDER 12

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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# PARTS LIST AND DESCRIPTIONS

WEBSTER-CHICAGO
MODEL 362

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA | | RMA BASE TYPE | INSTALLATION NOTES |
|---|---|---|---|---|---|
| | | Webster-Chicago PART No. | STANDARD REPLACEMENT | | |
| V1 | AF Amp. | 12SJ7 | 12SJ7 | 8N | |
| V2 | Power Output | 50L6GT | 50L6GT | 7AC | |
| V3 | Rectifier | 35Z5GT | 35Z5GT | 6AD | |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | Webster-Chicago PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | |
| C1A | 40 | 150 | | PRSA1064D | | EDL4415 | | TA-304 | Filter-Red |
| B | 40 | 150 | | | | BR2015A | | | Filter-Red |
| C | 20 | 150 | | | | | | | Filter-Blue |
| C2 | 10 | 25 | | PRS25/10 | | BR102A | | TVA-5 | Output Cath. Byp. |
| C3 | .05 | 400 | | P488-05 | | PTE4S5 | | TM-15 | Phono Isolation |
| C4 | .0005 | 600 | | 1468-0005 | D6-501 | 5W5T5 | GP2K-500 | TC-35 | Tone Comp. * |
| C5 | .002 | 600 | | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Audio Coupling |
| C6 | .01 | 400 | | P488-01 | D6-103 | PTE4S1 | 811-01 | TM-11 | Audio Coupling |
| C7 | .02 | 400 | | P488-02 | | PTE4S2 | | TM-12 | Tone Comp. |
| C8 | .005 | 600 | | P688-005 | D6-502 | PTE6D5 | 811-005 | TM-25 | Output Plate Byp. |
| C9 | .05 | 400 | | P488-05 | | PTE4S5 | | TM-15 | Line Isolation |

* Used only in model 362.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Webster-Chic PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | |
| R1 | 250KΩ | ½ | | | | | Volume control |
| R2 | 50KΩ | ½ | | | | | Tone control and switch |

## RESISTORS

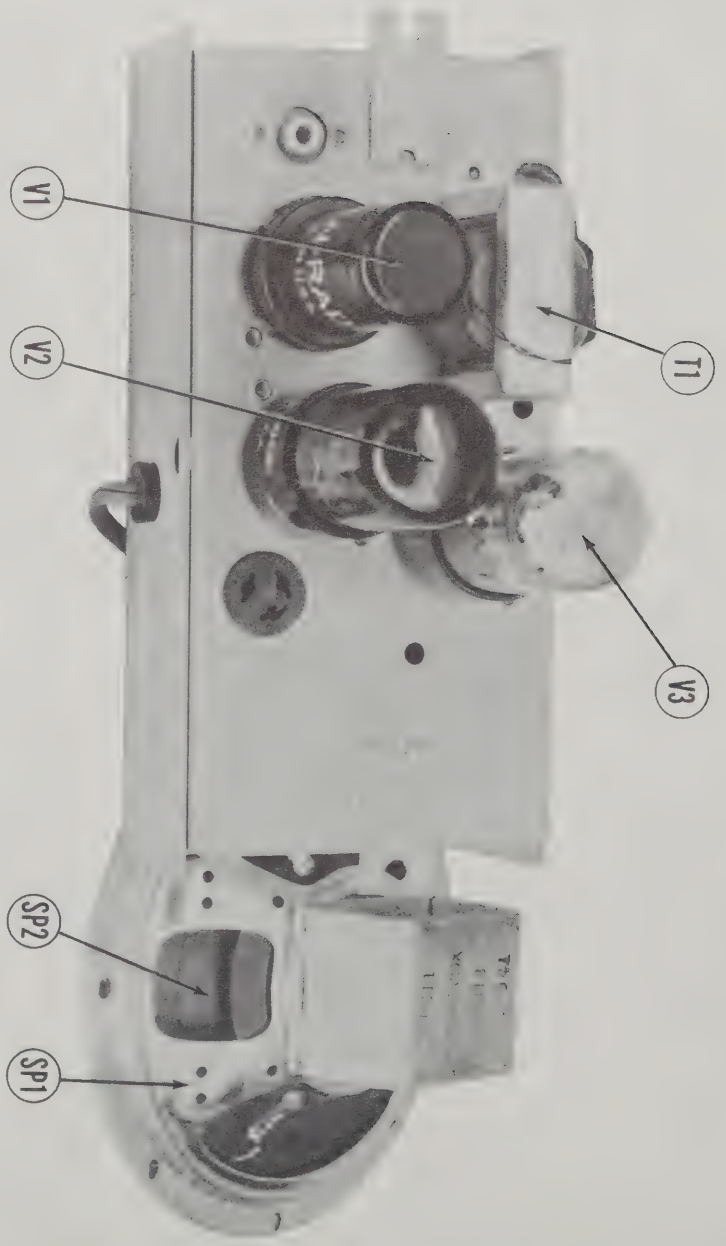
| ITEM No. | RATING | | REPLACEMENT DATA | | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Webster-Chic. PART No. | IRC PART No. | |
| R3 | 470KΩ | ½ | | BTS-470K | Tone Compensation-See Note |
| R4 | 4.7 Meg. | ½ | | BTS-4.7 Meg. | Phono Amp. Grid |
| R5 | 56KΩ | ½ | | BTS-56K | Phono Amp. Plate |
| R6 | 470KΩ | ½ | | BTS-470K | Output Grid |
| R7 | 150Ω | ½ | | BW-½-150 | Output Cathode |
| R8 | 5100Ω | ½ | | BTS-4700 | Filter |
| R9 | 100Ω | ½ | | BW-½-100 | Filter |
| R10 | 27Ω | ½ | | | Rect. Ballast |
| R11 | 140Ω | 10 | | | Filament Dropping - Wire Wound |

Note. Not used in model 762

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | Webster-Chicago PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | |
| T1 | 2300Ω | 4.1Ω | 180Ω | .7Ω | | A-3876 | A-2928 | RO-2 | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | RATINGS | | REPLACEMENT DATA | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|
| | | | Webster-Chicago PART No. | JENSEN PART No. | QUAM PART No. | |
| | FIELD | V. C. IMP. | | ST-105 | | |
| SP1 | PM | 4.1Ω | | MOD. P5-X | 5A07 | |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2 | 4 5/8" | 9/16" | | | | |

## DIAL LIGHTS

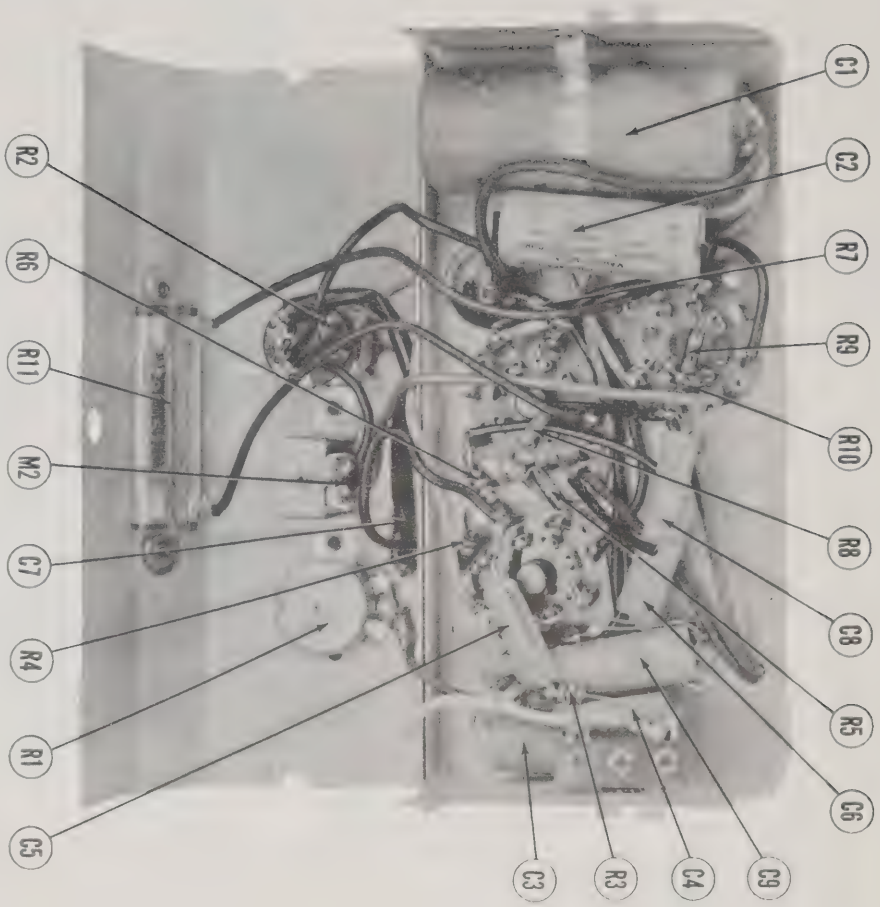
| ITEM No. | BASE TYPE | VOLTS | AMPS. | BEAD COLOR | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|---|
| | | | | | Webster-Chicago PART No. | | |
| M2 | Bayonet | 6-8 | .15 | Brown | | | Type #47 |

## PHONO CARTRIDGE and NEEDLE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | Webster-Chicago PART No. | ASTATIC PART No. | | SHURE PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M1A | | LQD-1J | Q | | | Used in Model 362 |
| M1B | | GC-J | G(J) | | | Used in Model 762 |

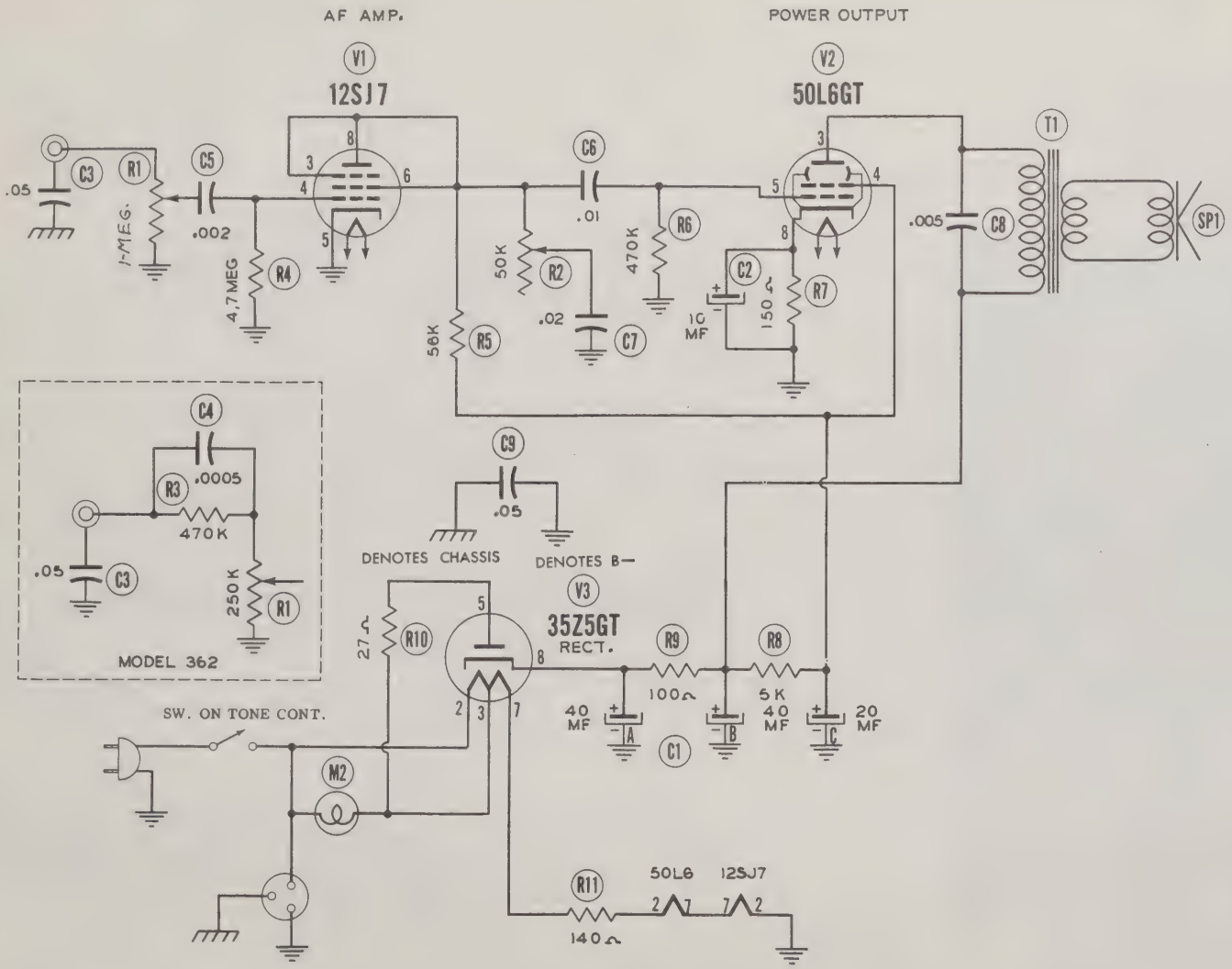
ASTATIC NEEDLE LISTINGS SHOWN ABOVE ARE FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED

# CHASSIS—BOTTOM VIEW






WEBSTER-CHICAGO MODEL 362




| Pin | 12SJ7 | | 50L6GT | |
|---|---|---|---|---|
| No. | Volt. | Res. | Volt. | Res. |
| 1 | 0V. | Inf. | 0V. | Inf. |
| 2 | 0V. | 0Ω | 63VAC | 63Ω |
| 3 | 33VDC | †60KΩ | 115VDC | †280Ω |
| 4 | -.5VDC | 4.7 Meg. | 100VDC | †5KΩ |
| 5 | 0V. | 0Ω | 0V. | 470KΩ |
| 6 | 33VDC | †60KΩ | 0V. | Inf. |
| 7 | 12VAC | 13Ω | 12VAC | 13Ω |
| 8 | 33VDC | †60KΩ | 6.3VDC | 150Ω |

| Pin | 35Z5GT | |
|---|---|---|
| No. | Volt. | Res. |
| 1 | 0V. | Inf. |
| 2 | 117VAC | 220Ω |
| 3 | 112VAC | 215Ω |
| 4 | 125VDC | †100Ω |
| 5 | 110VAC | 240Ω |
| 6 | 0V. | Inf. |
| 7 | 84VAC | 200Ω |
| 8 | 130VDC | 225KΩ |

† MEASURED FROM PIN 8 OF V3.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

**WESTINGHOUSE MODELS**

**H-610T12, H-614T12 (CH. V-2150-136)**

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**WESTINGHOUSE MODELS**

**H-610T12, H-614T12 (CH. V-2150-136)**

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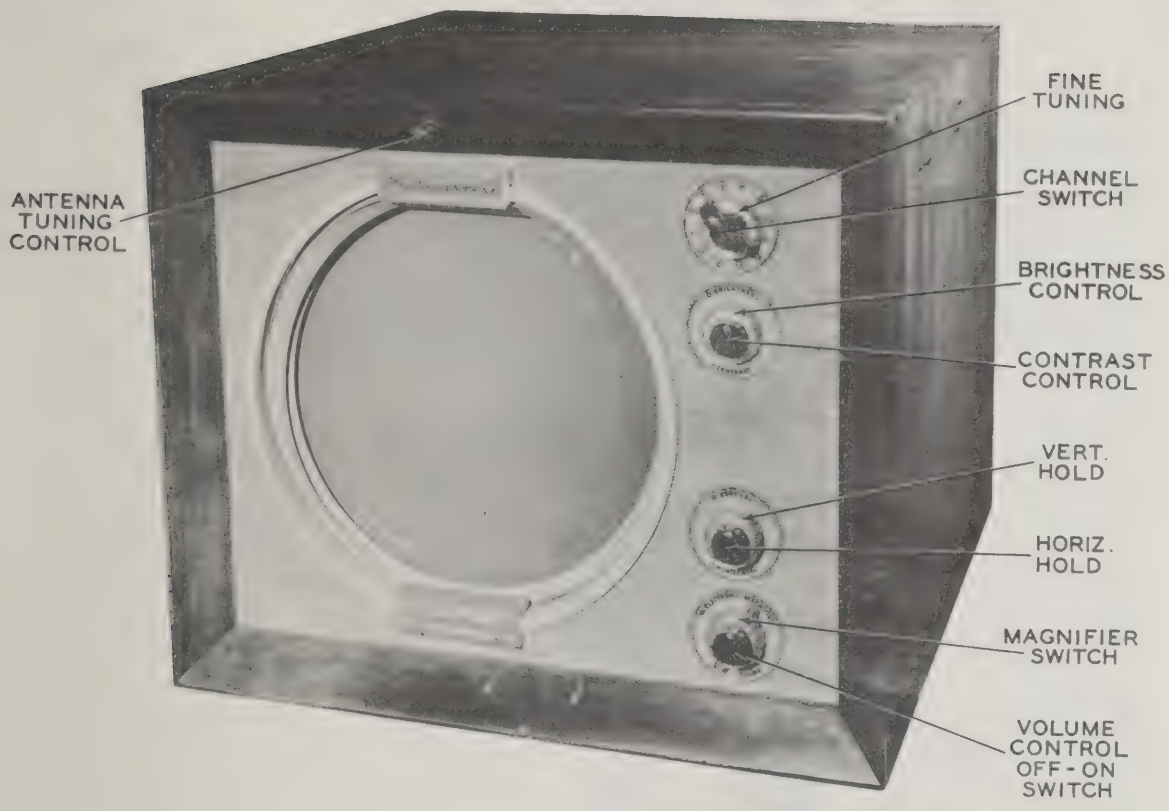
**Date 9/50 Set No. 105—Folder No. 13**

# WESTINGHOUSE MODELS H-610T12, H-614T12 (Ch. V-2150-136)




WESTINGHOUSE MODELS H-610T12, H-614T12 (Ch. V-2150-136)

WESTINGHOUSE MODEL 610T12

| | |
|---|---|
| TRADE NAME | Westinghouse, Models H-610T12, H-614T12 (Ch. V-2150-136) |
| MANUFACTURER | Westinghouse Electric Corp., Receiver Div., Sunbury, Pa. |
| TYPE SET | Television Receiver |
| TUBES | Twenty-Eight |
| POWER SUPPLY | 105-120 Volts AC 60 Cycle — RATING 2.3 Amp. at 117 Volts AC |
| TUNING RANGE | Channels 2 thru 13 |

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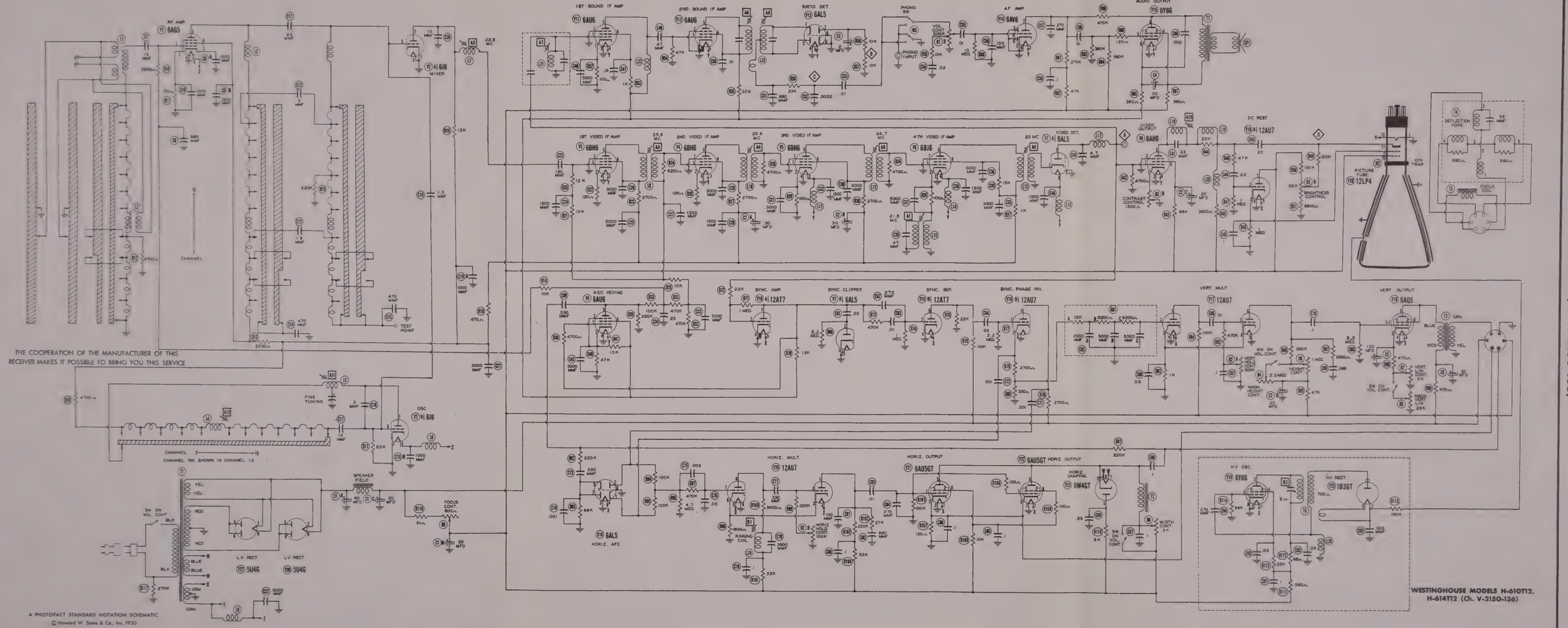


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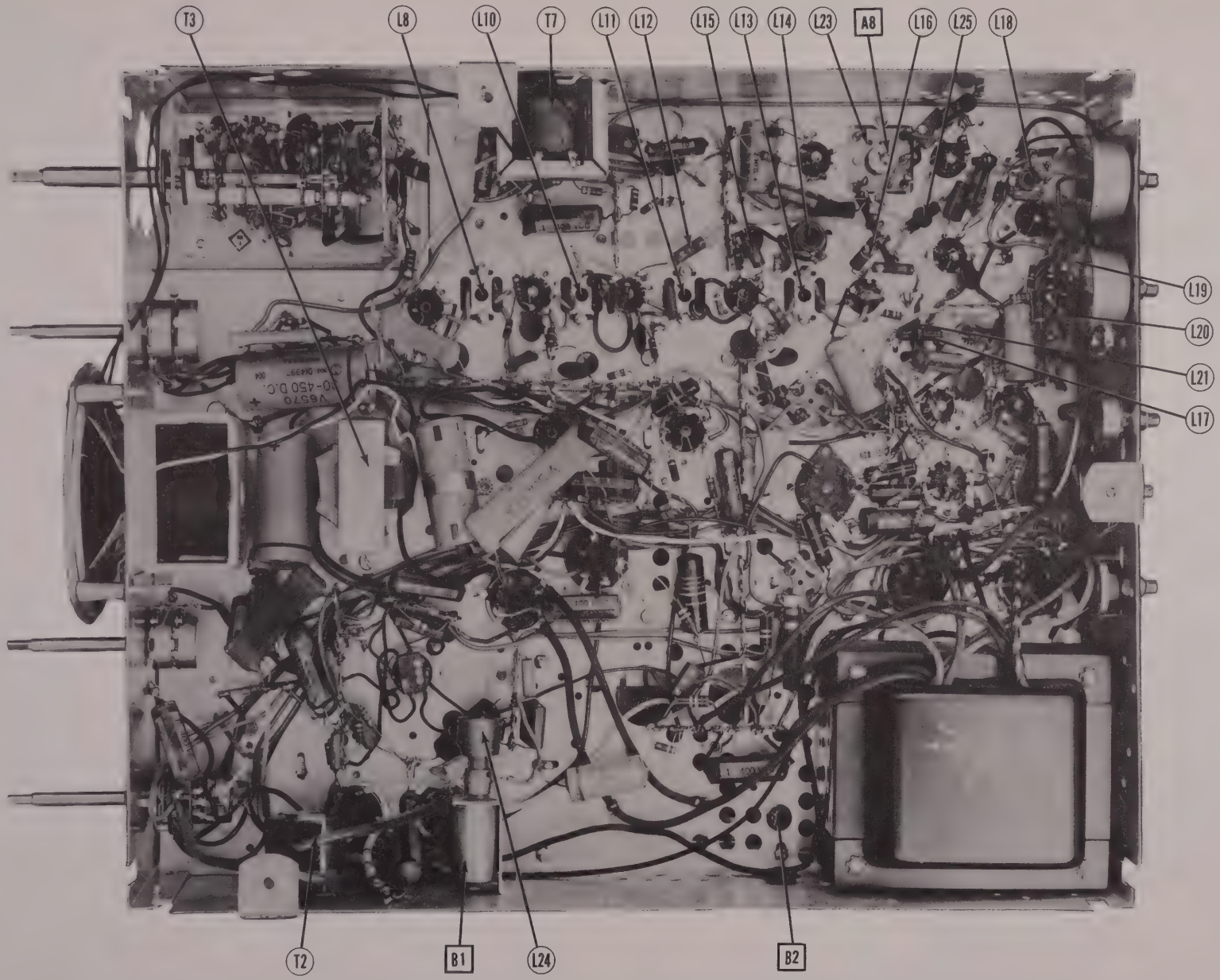
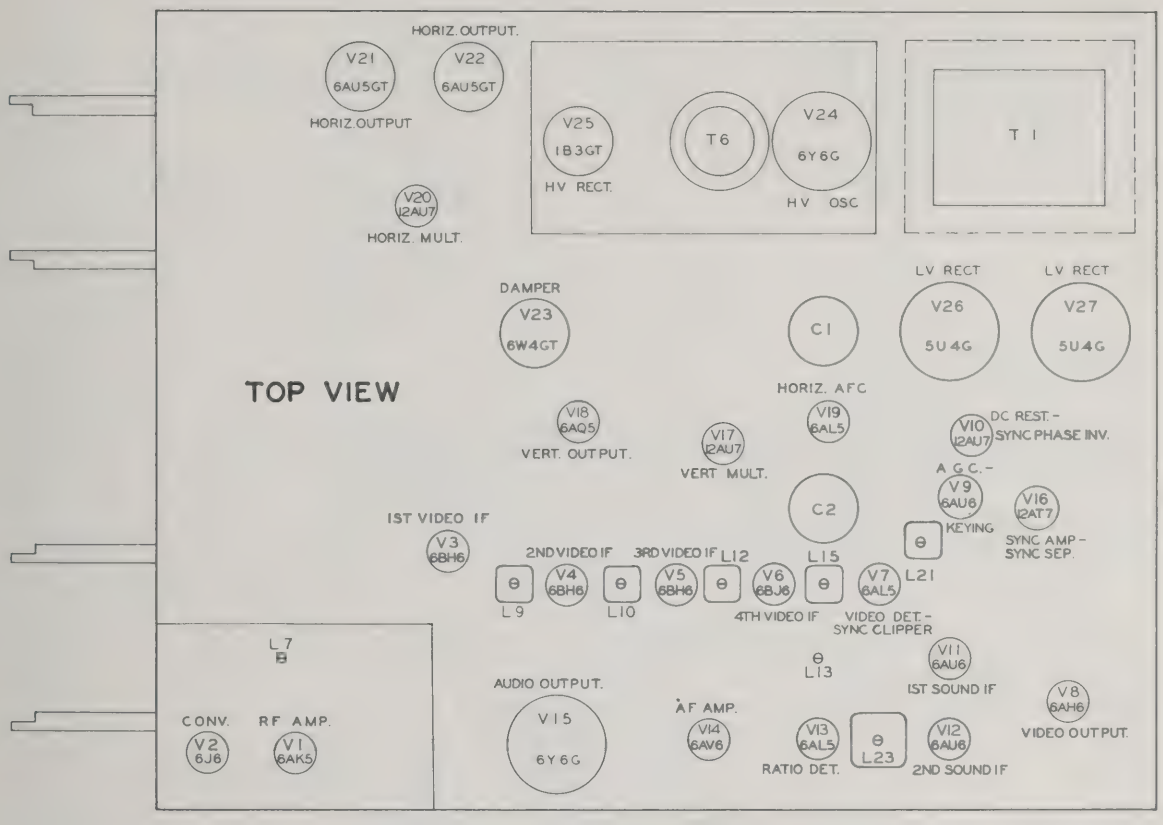
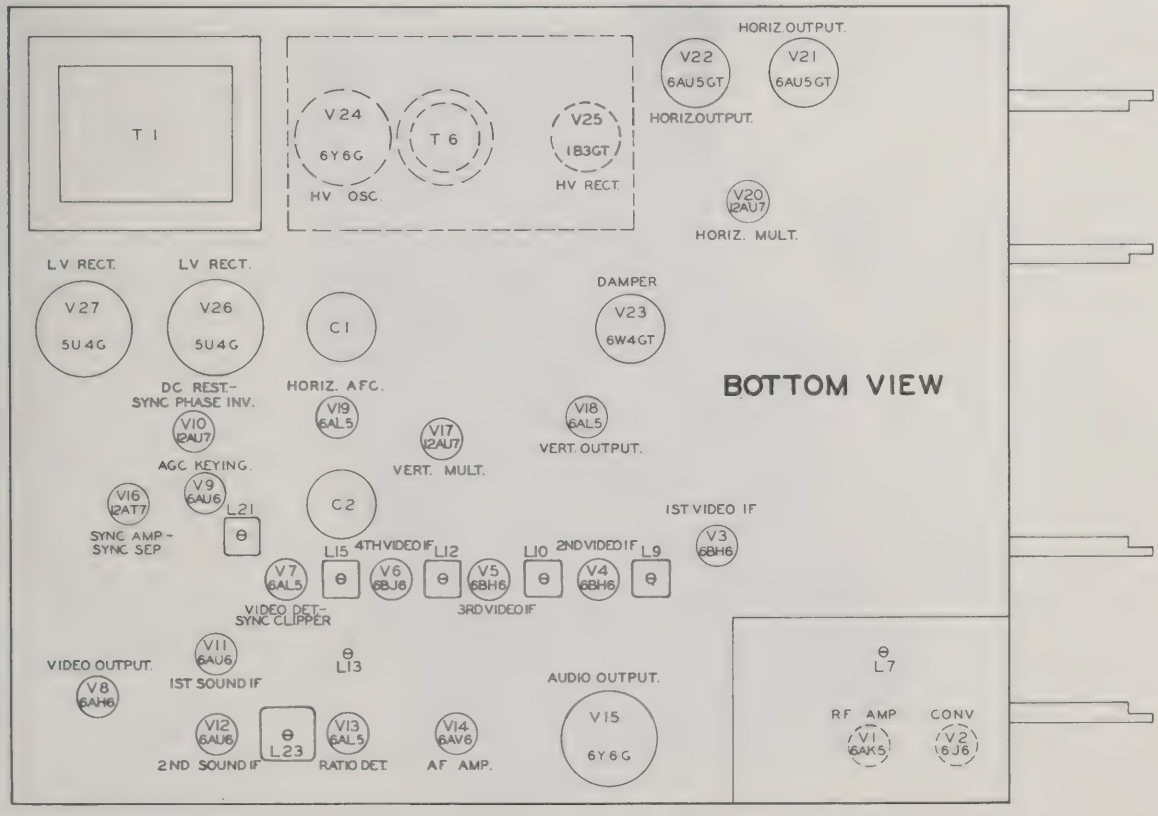
WESTINGHOUSE MODELS H-610T12, H-614T12 (Ch. V-2150-136)

CHASSIS TOP VIEW




CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION




TUBE PLACEMENT CHART

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

If picture tube is removed during alignment the high voltage lead should be securely taped and dressed away from chassis.

## VIDEO IF ALIGNMENT

Remove the converter tube from its socket and replace with a 6J6 with pin 1 removed to prevent erroneous indications.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 21.6MC (Unmod.) | Any | DC Probe to Point (A). Common to chassis. | A1 | Adjust for MINIMUM deflection. Use strong signal from signal generator. |
| 2. | Direct | " | 22.6MC (Unmod.) | " | " | A2 | Adjust for maximum deflection Attenuate signal generator to maintain a maximum -2 volt reading. |
| 3. | Direct | " | 25.9MC (Unmod.) | " | " | A3 | " |
| 4. | Direct | " | 25.6MC (Unmod.) | " | " | A4 | " |
| 5. | Direct | " | 24.7MC (Unmod.) | " | " | A5 | " |
| 6. | Direct | " | 23MC (Unmod.) | " | " | A6 | " |

## OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. Construct a filter for the oscilloscope vertical amplifier input consisting of a 200KΩ resistor in series with the vertical amplifier input lead, and a 500MMF capacitor across the vertical amplifier terminals.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | Direct | High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis. | 25.3MC (10MC SWP) | 21.6MC<br>22.5MC<br>23.5MC<br>25.3MC<br>26.1MC | Any | Vert. Amp. thru 200KΩ to Point (A). Low side to chassis. | | Check for response curve similar to figure 1. The 22.5MC and 26.1MC markers should be between 40 and 50% of maximum response. If necessary retouch A2 thru A6 for proper response. |

## SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 8. | .001MFD | High side to point A. Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe to Point (B). Common to chassis. | A7, A8 | Adjust for maximum deflection. |
| 9. | .001MFD | " | " | " | DC Probe to Point (C). Common to Point (B). | A9 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

## SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | .001MFD | High side to Point A. Low side to chassis. | 4.5MC (450KC Sweep) | 4.5MC | Any | Vert. Amp. to Point (B). Low side to chassis. | A7, A8 | Disconnect stabilizer capacitor C3. Adjust for maximum amplitude and symmetry as per figure 2. |
| 9. | .001MFD | " | " | " | " | Vert. Amp. to Point (C). Low side to chassis. | A9 | Reconnect capacitor C3. Adjust A9 to place 4.5MC at center of crossover lines as per figure 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines. |

## 4.5MC TRAP ADJUSTMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 10. | .001MFD | High side to Point A. Low side to chassis. | 4.5MC (Unmod.) | Any | DC Probe thru detector Probe as per figure 4 to Point (D). Common to chassis. | A10 | Adjust for MINIMUM deflection. Use strong signal from signal generator. |

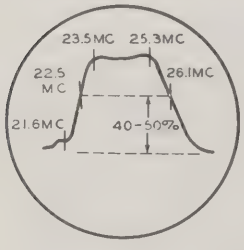



FIG. 1

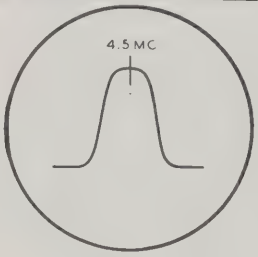



FIG. 2

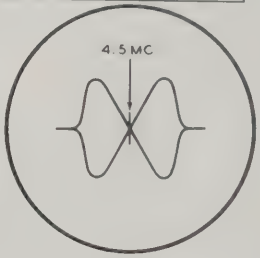



FIG. 3

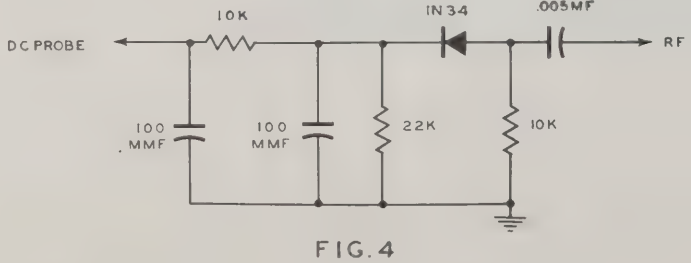



FIG. 4

# ALIGNMENT INSTRUCTIONS (CONT.)

## OSCILLATOR ALIGNMENT

Remove dummy converter tube and replace original 6J6 in its socket.
Set the fine tuning control to the mid-position of its range.
The RF and mixer portions of this receiver are pre-set at the factory and should not require adjustment in the field.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 11. | Two 120Ω carbon res. | Across antenna terminals with 120Ω in each lead. | 213MC (10MC SWP) | 211.25MC 215.75MC | 13 | Vert. Amp. to Point (A) Low side to chassis. | A11 | Adjust A11 to place sound marker in notch as shown in figure 5. Video marker should be at 50% response. |
| 12. | " | " | 207MC (10MC SWP) | 205.25MC 209.75MC | 12 | " | | Check to see if sound marker is in place well within tuning range of fine tuning control. If not, a compromise adjustment of A-11 will be required. |
| | | | 201MC (10MC SWP) | 199.25MC 203.75MC | 11 | | | |
| | | | 195MC (10MC SWP) | 193.25MC 197.75MC | 10 | | | |
| | | | 189MC (10MC SWP) | 187.25MC 191.75MC | 9 | | | |
| | | | 183MC (10MC SWP) | 181.25MC 185.75MC | 8 | | | |
| | | | 177MC (10MC SWP) | 175.25MC 179.75MC | 7 | | | |
| 13. | " | " | 85MC (10MC SWP) | 83.25MC 87.75MC | 6 | " | A12 | Adjust A12 to place sound marker in notch as shown in figure 5. Video marker should be at 50% response. |
| 14. | " | " | 79MC (10MC SWP) | 77.25MC 81.25MC | 5 | " | | Check to see if sound marker is in place well within tuning range of fine tuning control. If not, a compromise adjustment of A12 will be required. |
| | | | 69MC (10MC SWP) | 67.25MC 71.75MC | 4 | | | |
| | | | 63MC (10MC SWP) | 61.25MC 65.75MC | 3 | | | |
| | | | 57MC (10MC SWP) | 55.25MC 59.75MC | 2 | | | |

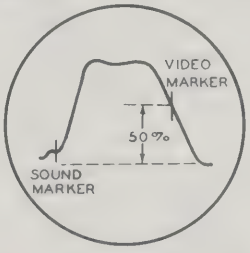
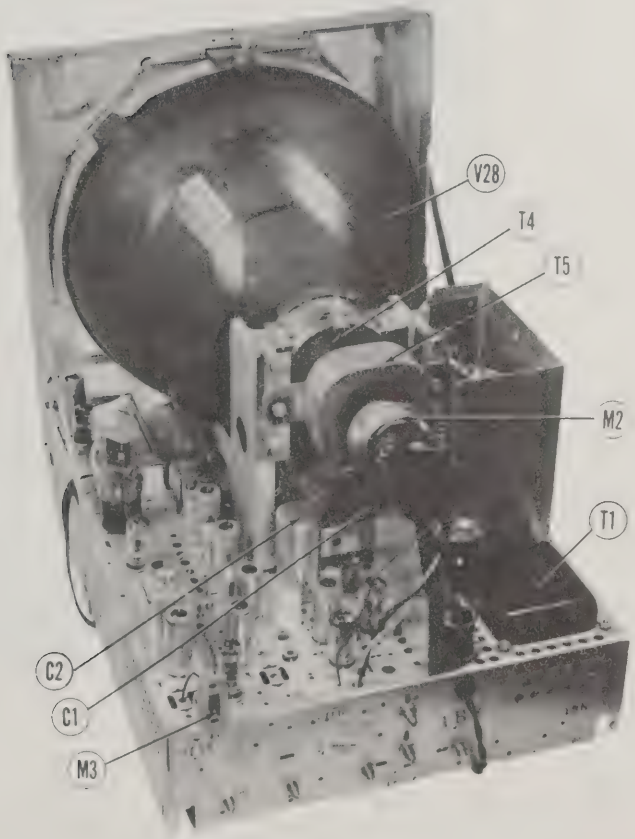



FIG.5




CHASSIS-TOP VIEW

# VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AK5 | .1VDC | .6VDC | 6.3VAC | 0V. | 85VDC | 85VDC | .6VDC | | |
| V 2 | 6J6 | 70VDC | 50VDC | 0V. | 6.3VAC | -1.6VDC | §-5.4VDC | 0V. | | |
| V 3 | 6BH6 | 0V. | .7VDC | 6.3VAC | 0V. | 95VDC | 95VDC | 0V. | | |
| V 4 | 6BH6 | 0V. | .6VDC | 6.3VAC | 0V. | 95VDC | 95VDC | 0V. | | |
| V 5 | 6BH6 | 0V. | .6VDC | 6.3VAC | 0V. | 95VDC | 95VDC | 0V. | | |
| V 6 | 6BJ6 | 0V. | .8VDC | 0V. | 6.3VAC | 100VDC | 70VDC | 0V. | | |
| V 7 | 6AL5 | 0V. | -.8VDC | 6.3VAC | 0V. | 0V. | 0V. | -.1VDC | | |
| V 8 | 6AH6 | -.1VDC | 0V. | 0V. | 6.3VAC | 270VDC | 240VDC | 5.5VDC | | |
| V 9 | 6AU6 | 60VDC | 76VDC | 6.3VAC | 0V. | 0V. | 110VDC | 76VDC | | |
| V 10 | 12AU7 | 285VDC | 0V. | 26VDC | 0V. | 0V. | 280VDC | 0V. | 12VDC | 6.3VAC |
| V 11 | 6AU6 | 0V. | 0V. | 0V. | 6.3VAC | 115VDC | 110VDC | .8VDC | | |
| V 12 | 6AU6 | -.4VDC | 0V. | 0V. | 6.3VAC | 47VDC | 47VDC | 0V. | | |
| V 13 | 6AL5 | -.1VDC | -.1VDC | 6.3VAC | 0V. | 0V. | 0V. | -.4VDC | | |
| V 14 | 6AV6 | -.4VDC | 0V. | 6.3VAC | 0V. | 0V. | 0V. | 115VDC | | |
| V 15 | 6Y6G | 0V. | 6.3VAC | #135VDC | #150VDC | #6.8VDC | #6.6VDC | 0V. | #23VDC | |
| V 16 | 12AT7 | 60VDC | .1VDC | 0V. | 6.3VAC | 6.3VAC | 28VDC | -.4VDC | 0V. | 0V. |
| V 17 | 12AU7 | 60VDC | 1VDC | 2.6VDC | 0V. | 0V. | 110VDC 65VDC | -20VDC | 2.6VDC | 6.3VAC |
| V 18 | 6AQ5 | 0V. | 13VDC 36VDC | 6.3VAC | 0V. | 280VDC | 280VDC | 0V. | | |
| V 19 | 6AL5 | 1.4VDC | -1.2VDC | 0V. | 6.3VAC | 0V. | 0V. | 0V. | | |
| V 20 | 12AU7 | 90VDC | -2.3VDC | 7.5VDC | 6.3VAC | 6.3VAC | 170VDC | .1VDC | 7.5VDC | 0V. |
| V 21 | 6AU5GT | -1.4VDC | 0V. | 12VDC | 0V. | * | 0V. | 6.3VAC | 120VDC | |
| V 22 | 6AU5GT | -1.4VDC | 0V. | 12VDC | 0V. | * | 0V. | 6.3VAC | 120VDC | |
| V 23 | 6W4GT | 0V. | 0V. | * | 0V. | 35VDC | 0V. | ¶ | ¶ | |
| V 24 | 6Y6G | 0V. | 0V. | 285VDC | 90VDC | -44VDC | 0V. | 6.3VAC | 0V. | |
| V 25 | 1B3GT | * DO NOT MEASURE. | | | | | | | | |
| V 26 | 5U4G | 0V. | 300VDC | 0V. | 300VAC | 0V. | 300VAC | 0V. | 300VDC | |
| V 27 | 5U4G | 0V. | 300VDC | 0V. | 300VAC | 0V. | 300VAC | 0V. | 300VDC | |
| V 28 | 12LP4 | 0V. | 26VDC | PIN 10 285VDC | PIN 11 110VDC | PIN 12 6.3VAC | | | | |

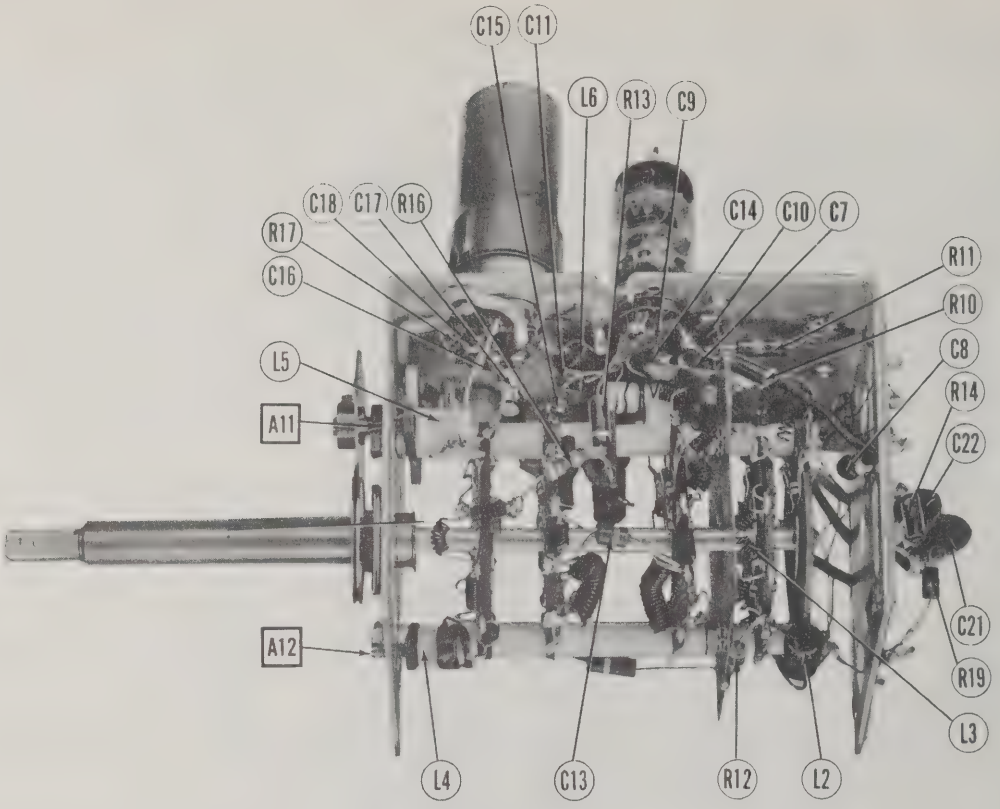
TV-PHONO SWITCH IN "TV" POSITION.
FOCUS CONTROL SET FULLY COUNTERCLOCKWISE.
* DO NOT MEASURE.
¶ 6.3VAC MEASURED ACROSS FILAMENTS.
§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

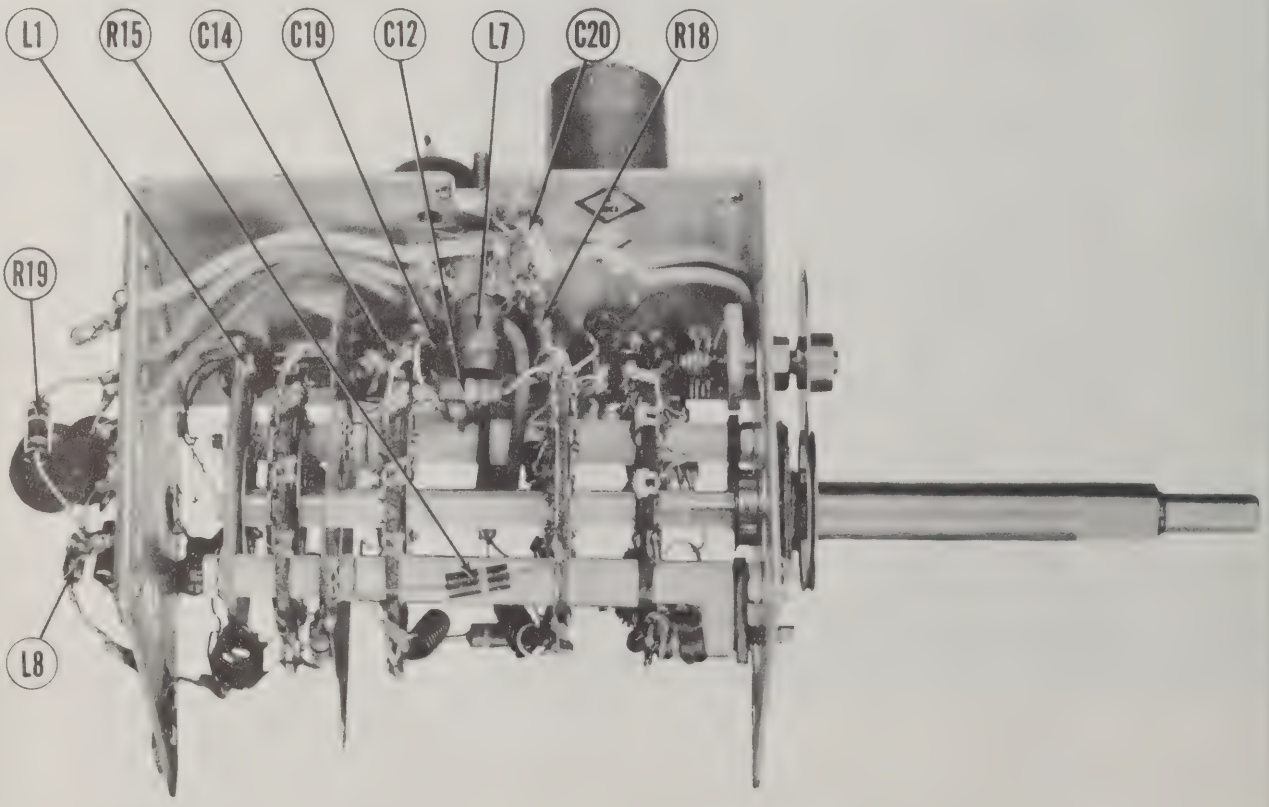
| Item | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V 1 | 6AK5 | 270KΩ | 100Ω | .1Ω | 0Ω | #2.7KΩ | #2.7KΩ | 100Ω | | |
| V 2 | 6J6 | #5KΩ | #15KΩ | 0Ω | .1Ω | 220KΩ | 2[illegible]KΩ | 0Ω | | |
| V 3 | 6BH6 | 320KΩ | 120Ω | .1Ω | 0Ω | #2.7KΩ | #2.7KΩ | 0Ω | | |
| V 4 | 6BH6 | 305KΩ | 120Ω | .1Ω | 0Ω | #2.7KΩ | #2.7KΩ | 0Ω | | |
| V 5 | 6BH6 | 1Ω | 100Ω | 1Ω | 0Ω | #2.7KΩ | #2.7KΩ | 0Ω | | |
| V 6 | 6BJ6 | 1Ω | 100Ω | 0Ω | 1Ω | #1000Ω | #16KΩ | 0Ω | | |
| V 7 | 6AL5 | 1Ω | 2.2 Meg. | 1Ω | 0Ω | 0Ω | 0Ω | 4.7KΩ | | |
| V 8 | 6AH6 | 4.7KΩ | 0Ω | 0Ω | .1Ω | †3.7KΩ | †68KΩ | 1.5KΩ | | |
| V 9 | 6AU6 | #20KΩ | 47KΩ | .1Ω | 0Ω | 200KΩ | #0Ω | 47KΩ | | |
| V 10 | 12AU7 | †145Ω | 1 Meg. | 1 Meg. | 0Ω | 0Ω | †2.8KΩ | 2.2 Meg. | 3000Ω | .1Ω |
| V 11 | 6AU6 | 2Ω | 0Ω | 0Ω | .1Ω | #5Ω | #1000Ω | 100Ω | | |
| V 12 | 6AU6 | 47KΩ | 0Ω | 0Ω | .1Ω | #22KΩ | #22KΩ | 0Ω | | |
| V 13 | 6AL5 | Inf. | Inf. | .1Ω | 0Ω | 0Ω | 0Ω | 20KΩ | | |
| V 14 | 6AV6 | 10 Meg. | 0Ω | .1Ω | 0Ω | 0Ω | 0Ω | †200KΩ | | |
| V 15 | 6Y6G | Inf. | 1Ω | †850Ω | †700Ω | 240KΩ | 240KΩ | 0Ω | #390Ω | |
| V 16 | 12AT7 | #15KΩ | 27KΩ | 0Ω | .1Ω | .1Ω | †75KΩ | 1 Meg. | 0Ω | 0Ω |
| V 17 | 12AU7 | †100KΩ | 39KΩ | 1000Ω | 0Ω | 0Ω | †440KΩ †1.4 Meg. | 470KΩ | 1000Ω | .1Ω |
| V 18 | 6AQ5 | 2.2 Meg. | 5KΩ 470Ω | .1Ω | 0Ω | †1.2KΩ | †1.2KΩ | 2.2 Meg. | | |
| V 19 | 6AL5 | 4.8 Meg. | 4.8 Meg. | 0Ω | .1Ω | 68KΩ | 0Ω | 68KΩ | | |
| V 20 | 12AU7 | †255KΩ | 220KΩ | 1.8KΩ | .1Ω | .1Ω | †39KΩ | 5 Meg. | 1.8KΩ | 0Ω |
| V 21 | 6AU5GT | 100KΩ | 0Ω | 150Ω | Inf. | †580Ω †3.6KΩ | Inf. | .1Ω | †10KΩ | |
| V 22 | 6AU5GT | 100KΩ | 0Ω | 150Ω | Inf. | †580Ω †3.6KΩ | Inf. | .1Ω | †10KΩ | |
| V 23 | 6W4GT | Inf. | Inf. | †580Ω †3.6KΩ | Inf. | †8KΩ | Inf. | †580Ω †3.6KΩ | †580Ω †3.6KΩ | |
| V 24 | 6Y6G | 0Ω | 0Ω | †800Ω | †33KΩ | 68KΩ | 17Ω | .1Ω | 0Ω | |
| V 25 | 1B3GT | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | Inf. | TOP CAP 750Ω |
| V 26 | 5U4G | Inf. | 60KΩ | Inf. | 15Ω | Inf. | 15Ω | Inf. | 60KΩ | |
| V 27 | 5U4G | Inf. | 60KΩ | Inf. | 15Ω | Inf. | 15Ω | Inf. | 60KΩ | |
| V 28 | 12LP4 | 0Ω | 1 Meg. | PIN 10 †145Ω | PIN 11 140KΩ | PIN 12 .1Ω | | | | |

TV-PHONO SWITCH IN "TV" POSITION.
FOCUS CONTROL SET FULLY COUNTERCLOCKWISE.
† MEASURED FROM PIN 2 OF V26.
# MEASURED FROM JUNCTION OF R37, R65, AND C2B.

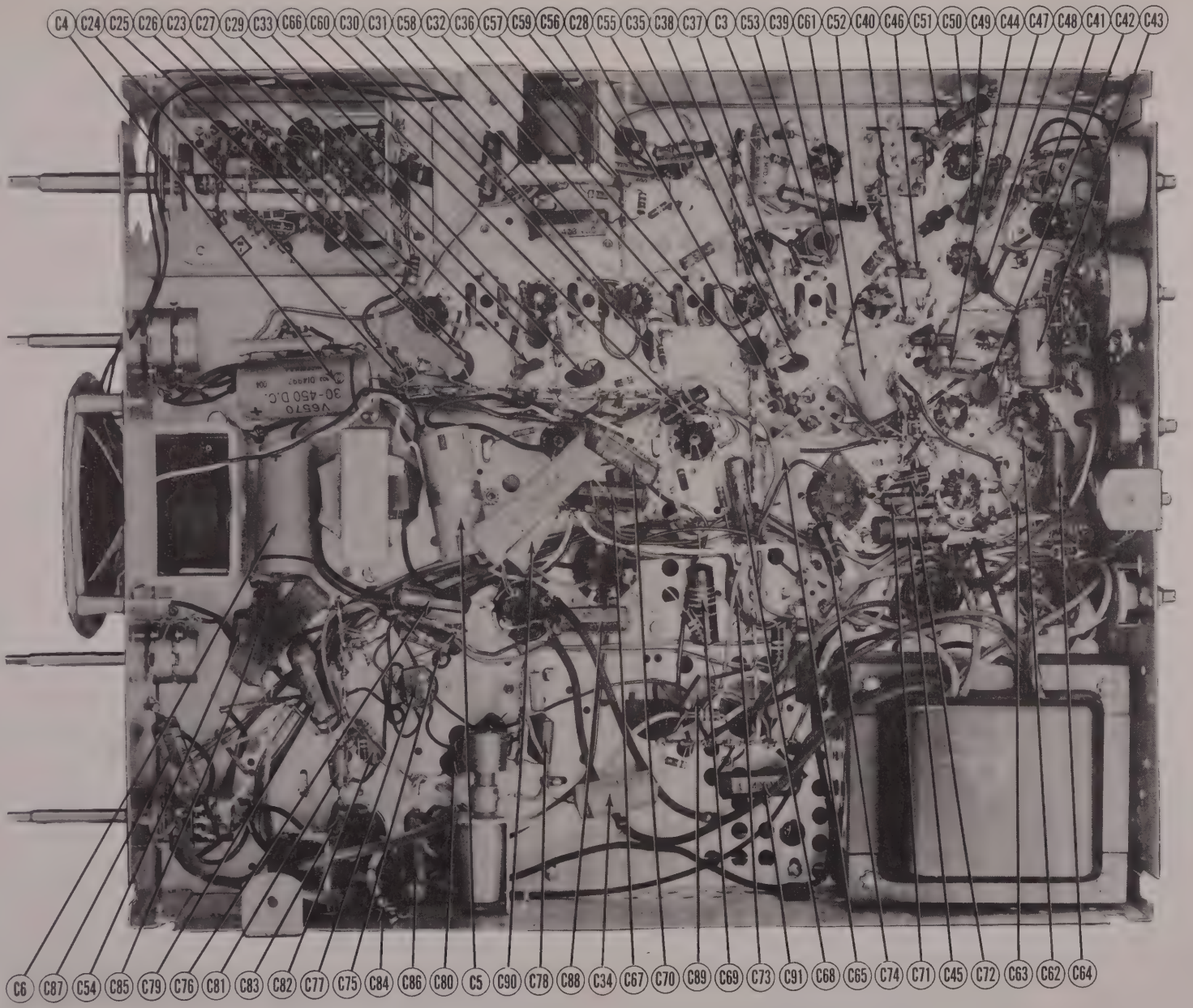
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



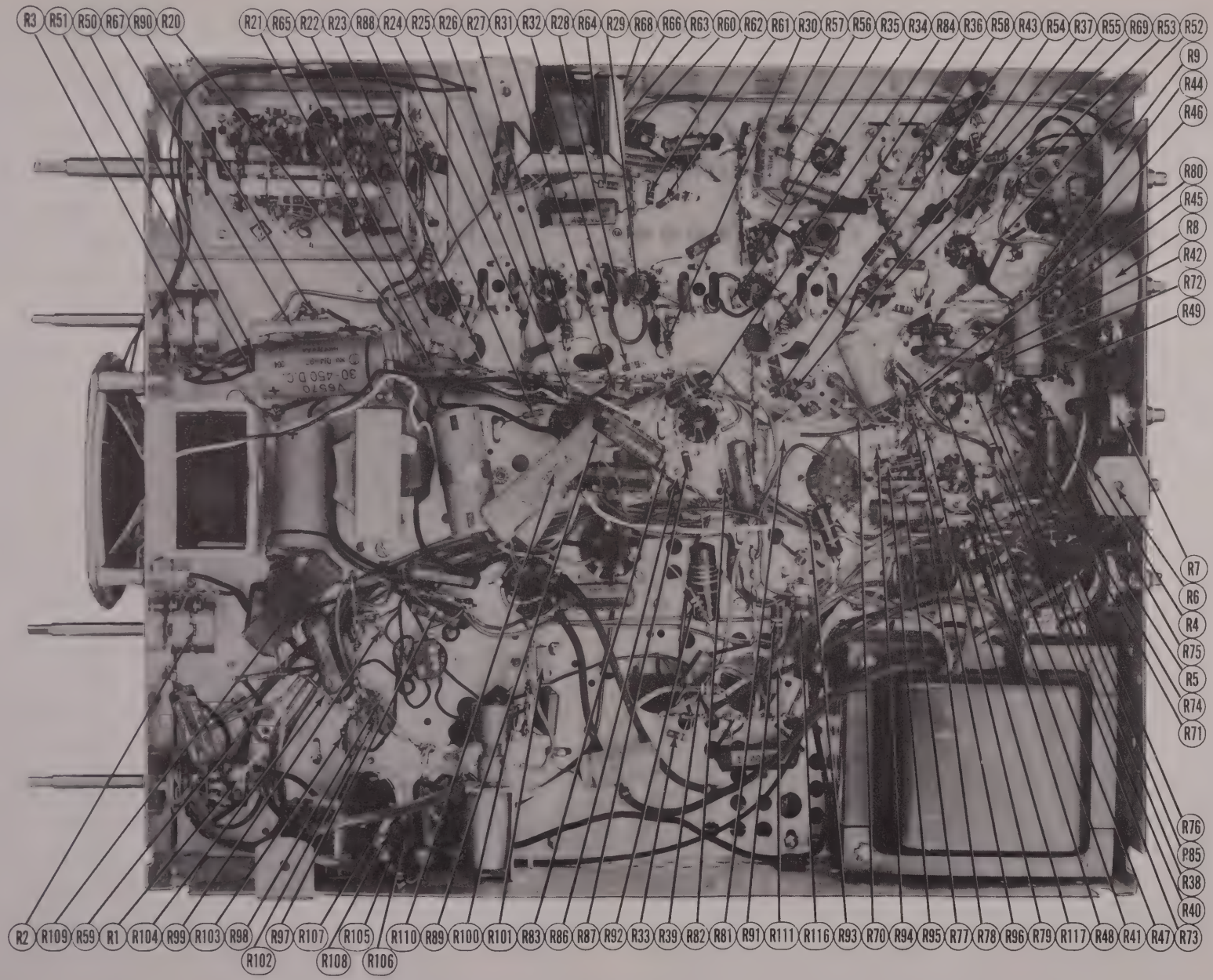

RF TUNER-RIGHT SIDE



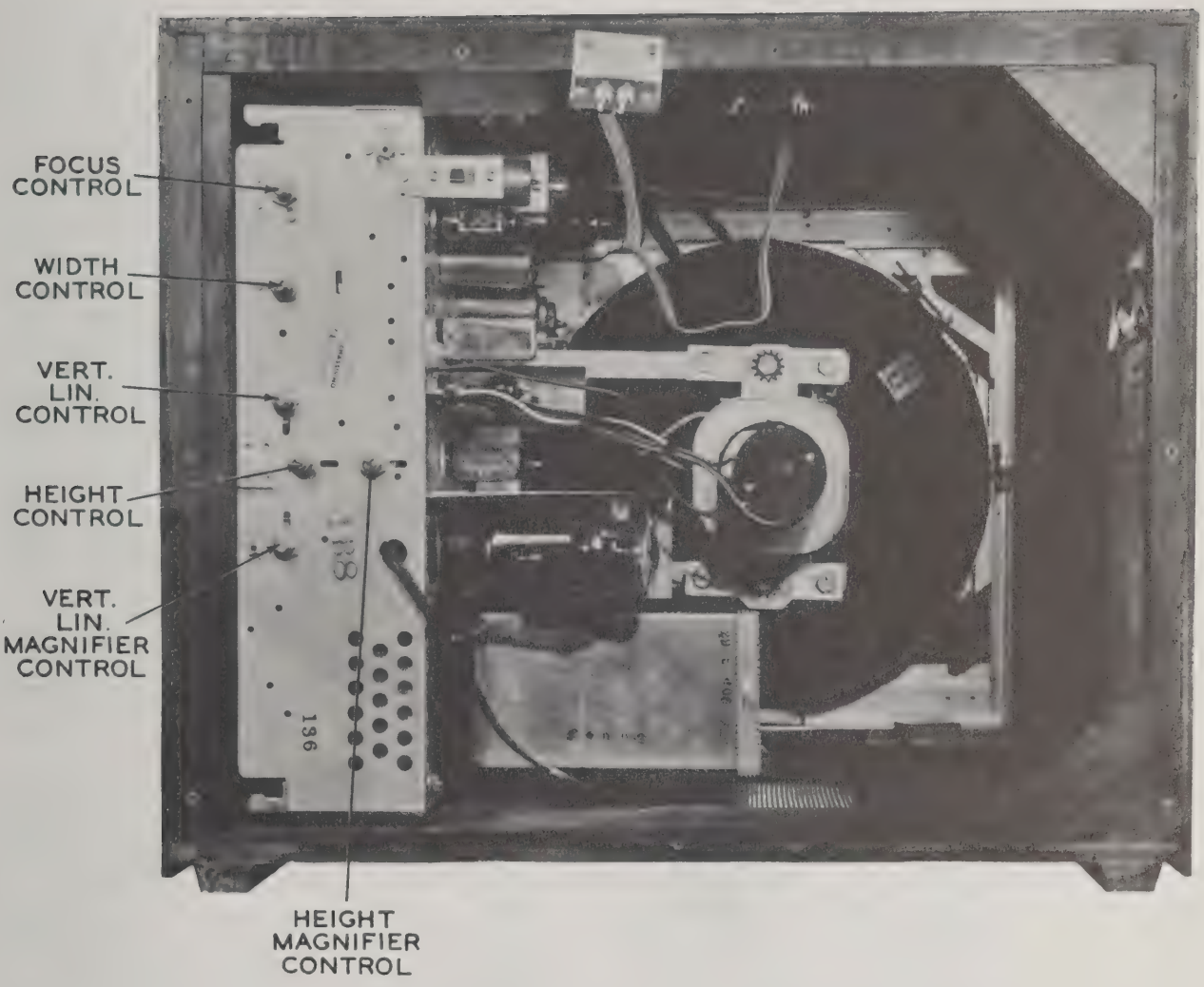

RF TUNER-LEFT SIDE




CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION




CABINET-REAR VIEW

# SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL FREQUENCY ADJUSTMENT

Turn set on and tune in a TV station preferably a test pattern. Turn the horizontal hold control to the mid-position of its range. Turn the magnifier switch to magnified (clockwise) position.

Adjust Ringing coil slug B1 to the center of the range over which the picture syncs horizontally.

HORIZONTAL WIDTH ADJUSTMENT

Turn the magnifier switch to magnified (clockwise) position and adjust horizontal hold control until picture synchronizes horizontally.

Turn the magnifier switch to "normal" (counter-clockwise) and without touching the hold control turn the width control until picture synchronizes horizontally and fills the mask horizontally.

VERTICAL HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS (NORMAL)

Turn the magnifier switch to "normal" (counter-clockwise). Adjust the height and vertical linearity controls until the picture is of proper height and is symmetrical from top to bottom. These two controls are interacting and will require alternate adjustment to obtain proper results.

VERTICAL HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS (MAGNIFIED)

Turn the magnifier switch to "magnified" (clockwise). Adjust the vertical linearity magnifier control and the height magnifier control alternately until the picture is of proper magnified height and is symmetrical from top to bottom. Each time the "normal" height and vertical linearity controls are changed, these controls will require readjustment.

# PARTS LIST AND DESCRIPTIONS

## TUBES (SYLVANIA or Equivalent)

| ITEM No. | USE | REPLACEMENT DATA WESTINGHOUSE PART No. | REPLACEMENT DATA STANDARD REPLACEMENT | RMA BASE TYPE | NOTES |
|---|---|---|---|---|---|
| V1 | RF Amp. | 6AK5 | 6AK5 | 7BD | |
| V2 | Converter | 6J6 | 6J6 | 7BF | |
| V3 | 1st Video IF | 6BH6 | 6BH6 | 7CM | |
| V4 | 2nd Video IF | 6BH6 | 6BH6 | 7CM | |
| V5 | 3rd Video IF | 6BH6 | 6BH6 | 7CM | |
| V6 | 4th Video IF | 6BJ6 | 6BJ6 | 7CM | |
| V7 | Video Det. -Sync. Clipper | 6AL5 | 6AL5 | 6BT | |
| V8 | Video Output | 6AH6 | 6AH6 | 7BK | |
| V9 | AGC Keying | 6AU6 | 6AU6 | 7BK | |
| V10 | DC Rest. -Sync. Sep. | 12AT7 | 12AT7 | 9A | |
| | Phase Inv. | 12AU7 | 12AU7 | 9A | |
| V11 | 1st Sound IF | 6AU6 | 6AU6 | 6BK | |
| V12 | 2nd Sound IF | 6AU6 | 6AU6 | 6BK | |
| V13 | Ratio Det. | 6AL5 | 6AL5 | 6BT | |
| V14 | AF Amp | 6AV6 | 6AV6 | 7BT | |
| V15 | Audio Output | 6Y6G | 6Y6G | 7C | |
| V16 | Sync Amp. -Sync Sep. | 12AT7 | 12AT7 | 9A | |
| | Phase Inv. | 12AU7 | 12AU7 | 9A | |
| V17 | Vert Mult | 12AU7 | 12AU7 | 9A | |
| V18 | Vert Output | 6AQ5 | 6AQ5 | 7BZ | |
| V19 | Hor AFC | 6AL5 | 6AL5 | 6BT | |
| V20 | Hor Mult. | 12AU7 | 12AU7 | 9A | |
| V21 | Hor Output | 6AU5GT | 6AU5GT | 6CK | |
| V22 | Hor Output | 6AU5GT | 6AU5GT | 6CK | |
| V23 | Hor Damper | 6W4GT | 6W4GT | 4CG | |
| V24 | Hor Osc | 6Y6G | 6Y6G | 7AC | |
| V25 | HV Rect | 1B3GT | 1B3GT | 3C | |
| V26 | BV Rect. | 5U4G | 5U4G | 5T | |
| V27 | LV Rect | 5U4G | 5U4G | 5T | |
| V28A | Picture Tube | 12LP4 | 12LP4 | 12D | Used in set |
| B | Picture Tube | 12LP4A | 12LP4A | 12D | May be used as a replacement |

## CAPACITORS

**Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA WESTINGHOUSE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 60 | 450 | V-9575 | AFI244J | | UP62245 | | TVL-3790 | ▲ Filter |
| B | 20 | 450 | | | | | | TVA-1705 | ■ Filter |
| C | 20 | 450 | | | | | | | ▲ Filter |
| C2A | 30 | 400 | V-9577 | AFH3666J | | | | TVL-4763 | ▲ Decoupling |
| B | 30 | 400 | | | | | | TVA-2722 | ■ Decoupling |
| C | 20 | 400 | | | | | | | ▲ V. Output Screen Byp. |
| D | 20 | 400 | | | | | | | Vert. MV Decoup. |
| C3 | 2 | 50 | V-4880 | PRS150/4 | | BBR2-50 | | TVA-12 | Stabilizing |
| C4 | 30 | 450 | V-6570 | PRS450/30 | | BR3045A | | TVA-23 | Output Decoup. |
| C5 | 150 | 50 | V-9576-1 | PRS50/100 PRS50/50 | | BRH5015 | | TVA-56 | Vert. Output Cath. Byp. |
| C6 | 30 | 450 | V-6570 | PRS450/30 | | BR3045A | | TVA-23 | Vert. Output Dec. |
| C7 | 15 | | | GP15K | D6-150 | | GP1K-15 | | RF Coupling |
| C8 | 680 | | | GP680M | D6-681 | | GP2K-680 | | AGC Filter |
| C9A | 1000 | | | GP1000M | D6-102 | | | | RF Supp. Bypass |
| B | 1000 | | | GP1000M | D6-102 | | 882-2 x 0015 | 29C7 | RF Decoup. |
| C10 | 1000 | | | GP1000M | D6-102 | | GP2L-001 | 29C4 | RF Cath. Bypass |
| C11 | 25 | | | | D2-.5 | | | | RF Coupling |
| C12 | .5 | | | | | | | | RF Coupling |
| C13 | 1.8 | | | | | | | | RF Coupling |
| C14 | 470 | | | GP470M | D6-471 | | GP2K-470 | | RF Decoupling |
| C15 | 470 | | | GP470M | D6-471 | | GP2K-470 | | Mixer Grid Filter |
| C16 | 1.5 | | | | D2-1.5 | | NPOK-1.5 | | Osc. Coupling |
| C17 | 10 | | | CN10FNPO | D2-10 | | NPOK-10 | | Osc. Grid Cap. |
| C18 | 3 | | | CN3DNPO | | | NPOK-3 | | Osc. Feedback |
| C19A | 1000 | | | GP1000M | D6-102 | | 882-2 x 0015 | 29C7 | RF Bypass |
| B | 1000 | | | GP1000M | D6-102 | | | | Conv. Fil. Byp. |
| C20 | 10 | | | CN10FNPO | D2-10 | | NPOK-10 | | Fixed Trimmer |
| C21 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | RF Bypass |
| C22 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | Filament Bypass |
| C23 | 150 | | R5CC21ZY151M | GP150M | D6-151 | 5W5T1 | GP2K-150 | 1FM-315 | IF Coupling |
| C24 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | AGC Filter |
| C25 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | RF Bypass |
| C26 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 1st V. IF Decoup. |
| C27 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | AGC Filter |
| C28 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | RF Bypass |
| C29 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 2nd V. IF Decoupling |
| C30 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 3rd V. IF Decoupling |
| C31 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 3rd V. IF Cath. Byp. |
| C32 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | 3rd V. IF Fil. Byp. |
| C33 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | AGC Filter |
| C34 | .25 | VOR | V-5595-4254M | P488-25 | | GT4P25 | | TC-2 | AGC Filter |
| C35 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 4th V. IF Decoup. |
| C36 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 4th Video IF Screen Byp. |
| C37 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 4th V. IF Cath. Byp. |
| C38 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | 4th V. IF Fil. Byp. |
| C39 | 47 | 300 | | 1469-00005 | D2-47 | 5R5Q5 | NPOM-50 | MS-45 | Fixed Trimmer |
| C40 | 4.7 | | V-5658-6 | GP5K | D2-4.7 | 5W5V5 | GP1K-5 | MS-55 | V. Diode Filter |
| C41 | 33 | 300 | | | D2-33 | | NPOL-33 | | Fixed Trimmer |
| C42 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | AGC Keying Cath. Byp. |
| C43 | .25 | 400 | V-6066-4254M | P488-25 | | GT4P25 | | TC-2 | Video Coupling |
| C44 | .02 | 400 | V-6033-4101M | P488-02 | | PTE4S2 | | TM-12 | Video Coupling |
| C45 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | DC Rest. Cath. Byp. |
| C46 | 1500 | | R5CC26ZY152M | GP1500M | D6-152 | 1W5D15 | GP2L-0015 | 1FM-215 | V. Det. -Clipper Fil. Byp |
| C47 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | 1st S. IF Screen Byp. |
| C48 | 5000 | | V-5596 | BPD-5 | D6-502 | 1D5D5 | 81I-005 | 29C1 | 1st S. IF Cath. Byp. |
| C49 | 47 | 500 | RCM20B470K | 1468-00005 | D6-470 | 5W5Q5 | GP1K-47 | 1FM-45 | S. IF Coupling |
| C50 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | 2nd S. IF Decoup. |
| C51 | 680 | 500 | RCM20B681K | GP680M | D6-681 | 1W5T | GP2K-680 | 1FM-37 | Diode Load Cap. |
| C52 | .0022 | 600 | V-6023-4202M | P688-0022 | D6-222 | PTE6D2 | GP2M-0022 | TM-22 | De-emphasis |
| C53 | .01 | 400 | V-6023-4103K | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Audio Coupling |

## CAPACITORS (CONT.)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA WESTINGHOUSE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | SPRAGUE PART No. | IDENTIFICATION CODES AND INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C54 | .02 | 400 | V-6023-4203M | P488-02 | | PTE4S2 | | TM-12 | Tone Comp. |
| C55 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Audio Coupling |
| C56 | 100 | 500 | RCM20B101K | 1468-0001 | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | AF Amp. Grid Byp. |
| C57 | 270 | 500 | RCM20B271K | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | AF Amp. Plate Byp. |
| C58 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | AF Amp. Plate Dec. |
| C59 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Audio Coupling |
| C60 | .002 | 600 | V-6023-4202M | P688-002 | D6-202 | PTE6D2 | GP2M-002 | TM-22 | Output Plate Bypass |
| C61 | .25 | 400 | V-6066-4254M | P488-25 | | GT4P25 | | TC-2 | Sync. Coupling |
| C62 | 270 | 500 | RCM20B271K | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Sync. Coupling |
| C63 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Sync. Coupling |
| C64 | .05 | 400 | V-6023-4503M | P488-05 | | PTE4S5 | | TM-15 | Sync. Coupling |
| C65A | 2000 | | * V-9213 | P688-002 | * PC-100 | PTE6D2 | GP2M-002 | TM-22 | Integrator Net. |
| B | 5000 | | | P688-005 | | PTE6D5 | 81I-005 | TM-25 | Integrator Net. |
| C | 5000 | | | P688-005 | | PTE6D5 | 81I-005 | TM-25 | Integrator Net. |
| C66 | .01 | 400 | V-6023-4103K | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Vert. MV Feedback |
| C67 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | Vert. MV Grid Byp. |
| C68 | .05 | 400 | V-6023-4503M | P488-05 | | PTE4S5 | | TM-15 | Vert. MV Cath. Byp. |
| C69 | .068 | 400 | V-6023-4683K | P488-068 | | | | | Vert. Discharge |
| C70 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | Vert. Sweep Coupling |
| C71 | .001 | 600 | V-6023-6102M | P688-001 | D6-102 | PTE6D1 | GP2L-001 | TM-21 | Hor. Sync. Coupling |
| C72 | .001 | 600 | V-6023-6102M | P688-001 | D6-102 | PTE6D1 | GP2L-001 | TM-21 | Hor. Sync. Coupling |
| C73 | 330 | 500 | RCM20C331J | 1469-00035 | D6-331 | 5R5T3 | GP2K-330 | MS-33 | Hor. Feedback |
| C74 | .001 | 600 | V-6023-6102M | P688-001 | D6-102 | PTE6D1 | GP2L-001 | TM-21 | Voltage Divider |
| C75 | .005 | 600 | V-6023-4472M | P688-005 | D6-502 | PTE6D5 | 81I-005 | TM-25 | AFC Filter |
| C76 | .05 | 400 | V-6023-4503M | P488-05 | | PTE4S5 | | TM-15 | AFC Filter |
| C77 | 330 | 500 | RCM20C331J | 1469-00035 | D6-331 | 5R5T3 | GP2K-330 | MS-33 | Hor. MV Feedback |
| C78 | 3900 | 500 | RCM30C392K | 1464-004 | | 1DR5D4 | | MS -24 | Fixed Trimmer |
| C79 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | Hor. MV Dec. |
| C80 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | Hor. MV Dec. |
| C81 | 100 | 500 | RCM20B101K | 1468-0001 | D6-101 | 5W5T1 | GP1K-100 | 1FM-31 | Hor. MV Plate Dec. |
| C82 | 680 | 500 | RCM20B681K | GP680K | D6-681 | 1W5T7 | GP2K-680 | 1FM-37 | Hor. Discharge |
| C83 | .01 | 400 | V-6023-4103M | P488-01 | D6-103 | PTE4S1 | 81I-01 | TM-11 | Hor. Sweep Coupling |
| C84 | 270 | 500 | RCM20B271K | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | Hor. Output Grid Byp. |
| C85 | .1 | 400 | V-6023-4103M | P488-1 | | PTE4P1 | | TM-1 | Hor. Output Screen Byp. |
| C86 | .1 | 400 | V-6023-4103M | P488-1 | | PTE4P1 | | TM-1 | Hor. Output Cath. Byp. |
| C87 | .1 | 400 | V-6023-4103M | P488-1 | | PTE4P1 | | TM-1 | Hor. Output Dec. |
| C88 | .1 | 400 | V-6023-4103M | P488-1 | | PTE4P1 | | TM-1 | Hor. Sweep Coupling |
| C89 | 330 | 500 | RCM20C331J | 1469-00035 | D6-331 | 5R5T3 | GP2K-330 | MS-33 | Hor. Feedback |
| C90 | .25 | 400 | V-6066-4254M | P488-25 | | GT4P25 | | TC-2 | Damper Filter |
| C91 | .1 | 400 | V-6023-4104M | P488-1 | | PTE4P1 | | TM-1 | HV Osc. Dec. |
| C92 | .05 | 400 | V-6023-4503M | P488-05 | | PTE4S5 | | TM-15 | HV Osc. Plate Dec. |
| C93 | .05 | 400 | V-6023-4503M | P488-05 | | PTE4S5 | | TM-15 | HV Osc. Screen Byp. |
| C94 | 270 | 500 | RCM20B271K | 1468-00025 | D6-271 | 5W5T25 | GP2K-270 | 1FM-325 | HV Osc. Grid Cap. |
| C95 | 500 | 10000 | V-5895 | | TV2-501 | | | | BV Osc. Filter |

* Items C65A, C65B, C65C, R81A, R81B and R81C are combined into one unit

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA Westinghouse PART No. | IRC PART No. | CLAROSTAT PART No. | CENTRALAB PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|
| R1A | Switch | | V-9607-1 | | | | Magnifier switch-front |
| B | 500KΩ | ½ | | | | | Volume control & on-off switch-rear |
| | | | | Concentrikit | | | |
| R2A | 500KΩ | | | B11-133 * | | | Vert. hold control-front |
| B | 100KΩ | ½ | V-9233 | B11-128 * | RTV-57 | SBB-514 | Horiz. hold control-rear |
| | Shaft End | | | E-202 * | | | Attach per "Concentrikit" instructions |
| R3A | 50KΩ | | V-9235-2 | | RTV-56 | SBB-513 | Brightness control-front |
| B | 1500Ω | ½ | | | | | Contrast control-rear |
| R4A | 2.5 Meg. | | V-5909 | Q11-239 | AM-84-S | AN-83 | Magnifier height control |
| B | Shaft | | Not Req. | RQ | RS-2 # | AK-1 | Attach to R4A per instructions |
| R5A | 25KΩ | ½ | V-5910 | Q11-120 | AM-40-S | AN-26 | Magnifier vert. linearity control |
| B | Shaft | | Not Req. | RQ | RS-2 # | AK-1 | Attach to R5A per instructions |
| R6A | 1 Meg. | ½ | V-6462 | Q11-137 | AM-61-S | AN-69 | Height control |
| B | Shaft | | Not Req. | RQ | RS-2 # | AK-1 | Attach to R6A per instructions |
| R7A | 5000Ω | ½ | V-6463 | Q11-114 | AM-19-S | AN-10 | Vert. linearity control |
| B | Shaft | | Not Req. | RQ | RS-2 # | AK-1 | Attach to R7A per instructions |
| R8 | 3000Ω | 4 | V-6500-2 | | RTV-61 | SVP-989 | Width control-Wire Wound |
| R9 | 600Ω | 4 | V-9232 | | RTV-59 | SVP-992 | Focus control-Wire Wound |

* Additional parts to be used with "Concentrikit".
# File slot in end of shaft to duplicate original.

## RESISTORS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA WESTINGHOUSE PART No. | IRC PART No. | IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED. |
|---|---|---|---|---|---|
| R10 | 2200Ω | | | BTS-2200 | AGC Network-See Note 1 |
| R11 | 100Ω | | | | RF Amp. Cathode |
| R12 | 4700Ω | | | BTS-4700 | RF Amp. Grid Coil Shunt-See Note 2 |
| R13 | 2200Ω | | | BTS-2200 | RF Amp. Decoupling-See Note 3 |
| R14 | 10KΩ | | | | AGC Network |
| R15 | 220KΩ | | | | Conv. Grid-See Note 4 |
| R16 | 4700Ω | | | BTS-4700 | Osc. Decoupling |
| R17 | 22KΩ | | | | Osc. Grid |
| R18 | 15KΩ | | | | Mixer Plate |
| R19 | 470Ω | | | BTS-470 | Conv. Decoupling |
| R20 | 12KΩ | | RC20AE123K | | 1st Video IF Amp. Grid |
| R21 | 10KΩ | | RC20AE103K | | AGC Network |
| R22 | 120Ω | | RC20AE121K | | 1st Video IF Amp. Cathode |
| R23 | 2700Ω | | RC20AE272K | BTS-2700 | 1st Video IF Amp. Decoupling |
| R24 | 8200Ω | | RC20AE822K | | 2nd Video IF Amp. Grid |
| R25 | 10KΩ | | RC20AE103K | | AGC Network |
| R26 | 120Ω | | RC20AE121K | | 2nd Video IF Amp. Cathode |
| R27 | 2700Ω | | RC20AE272K | BTS-2700 | 2nd Video IF Amp. Decoupling |
| R28 | 4700Ω | | RC20AE472K | BTS-4700 | 3rd Video IF Grid |
| R29 | 100Ω | | RC20AE101K | | 3rd Video IF Cathode |
| R30 | 2700Ω | | RC20AE272K | BTS-2700 | 3rd Video IF Decoupling |
| R31 | 470Ω | | RC20AE471K | BTS-470 | AGC Network |
| R32 | 470Ω | | RC20AE471K | BTS-470 | AGC Network |
| R33 | 100KΩ | | RC20AE104K | | AGC Filter |

## RESISTORS (CONT.)

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA WESTINGHOUSE PART No. | IRC PART No. | IDENTIFICATION CODES |
|---|---|---|---|---|---|
| R34 | 4700Ω | | RC20AE472K | BTS-4700 | 4th Video IF Amp. Grid |
| R35 | 100Ω | | RC20AE101K | | 4th Video IF Amp. Cathode |
| R36 | 15KΩ | | RC20AE153K | | 4th Video IF Screen |
| R37 | 1000Ω 20% | | RC20AE102M | BTS-1000 | 4th Video IF Amp. Decoupling |
| R38 | 4700Ω | | RC20AE472K | BTS-4700 | AGC Keying Grid |
| R39 | 220KΩ | 1 | RC30AE224K | BTA-220K | AGC Keying Plate |
| R40 | 47KΩ | | RC20AE473K | BTS-47K | AGC Keying Cathode |
| R41 | 15KΩ | | RC20AE153K | BTS-15K | Voltage Divider-See Note 5 |
| R42 | 4700Ω | | RC20AE472K | BTS-4700 | Video Amp. Grid |
| R43 | 68KΩ | | RC30AE684K | BTA-68K | Video Amp. Screen |
| R44 | 22KΩ | | RC20AE223K | BTS-22K | Peaking Coil Shunt |
| R45 | 3600Ω 5% | 1 | RC30AE362J | BTA-3600-5% | Video Amp. Plate |
| R46 | 47KΩ | | RC20AE473K | BTS-47K | Isolation |
| R47 | 1 Meg. | | RC20AE105K | BTS-1 Meg. | DC Rest. Load |
| R48 | 1 Meg. | | RC20AE105K | BTS-1 Meg. | Picture Tube Grid |
| R49 | 100KΩ | | RC20AE104K | BTS-100K | Picture Tube Cathode |
| R50 | 100KΩ | | RC20AE104K | BTS-100K | Voltage Divider |
| R51 | 6800Ω | | RC20AE682K | BTS-6800 | Voltage Divider |
| R52 | 100Ω | | RC20AE101K | | 1st Sound IF Amp. Cathode |
| R53 | 1000Ω 20% | | RC20AE102M | BTS-1000 | 1st Sound IF Amp. Screen |
| R54 | 47KΩ | | RC20AE473K | | 2nd Sound IF Amp. Grid |
| R55 | 22KΩ | | RC20AE223K | | 2nd Sound IF Amp. Decoupling |
| R56 | 10KΩ | | RC20AE103K | BTS-10K | Ratio Det. Diode Load |
| R57 | 10KΩ | | RC20AE103K | BTS-10K | Ratio Det. Diode Load |
| R58 | 33KΩ | | RC20AE333K | BTS-33K | De-emphasis |
| R59 | 10KΩ | | RC20AE103K | BTS-10K | Tone Compensation |
| R60 | 10 Meg. 20% | | RC20AE105M | BTS-10 Meg. | AF Amp. Grid |
| R61 | 270KΩ | | RC20AE274K | BTS-270K | AF Amp. Plate |
| R62 | 47KΩ | | RC20AE473K | BTS-47K | AF Amp. Plate Decoupling |
| R63 | 39KΩ 5% | | RC20AE393J | BTS-39K-5% | Audio Output Grid |
| R64 | 560KΩ 5% | | RC20AE564J | BTS-560K-5% | Audio Output Grid |
| R65 | 390Ω | 5 | V-6984-9 | | Audio Output Cathode-Wire Wound |
| R66 | 120Ω | | RC20AE121K | | Parasitic Suppressor-See Note 2 |
| R67 | 560Ω | 5 | V-6984-6 | | Audio Output Decoupling-Wire Wound |
| R68 | 470KΩ | | RC20AE474K | BTS-470K | Feedback |
| R69 | 2.2 Meg. | | RC20AE225K | BTS-2.2 Meg. | Sync. Clipper Load |
| R70 | 15KΩ | | RC20AE153K | BTS-15K | Sync. Amp. Plate |
| R71 | 1 Meg. | | RC20AE105K | BTS-1 Meg. | Sync. Amp. Grid |
| R72 | [illegible] | | RC20AE223K | BTS-22K | Isolation |
| R73 | 470KΩ | | RC20AE474K | BTS-470K | Charge Limiter |
| R74 | 1 Meg. | | RC20AE105K | BTS-1 Meg. | Sync. Sep. Grid |
| R75 | 22KΩ | | RC20AE223K | BTS-22K | Voltage Divider |
| R76 | 150KΩ | | RC20AE154K | BTS-150K | Sync. Amp. Plate |
| R77 | 2.2 Meg. | | RC20AE225K | BTS-2.2 Meg. | Sync. Phase Inv. Grid |
| R78 | 2700Ω | | RC20AE272K | BTS-2700 | Sync. Phase Inv. Plate |
| R79 | 2700Ω | | RC20AE272K | BTS-2700 | Sync. Phase Inv. Cathode |
| R80 | 330Ω | | RC20AE331K | BW-½-330 | Sync. Phase Inv. Cathode |
| R81A | 22KΩ | | | | Integrator |
| B | 8200Ω | | † | | Integrator |
| C | 8200Ω | | | | Integrator |
| R82 | 1000Ω | | RC20AE102K | BTS-1000 | Vert. Mult. Cathode |
| R83 | 470KΩ | | RC20AE474K | BTS-470K | Vert. Mult. Grid |
| R84 | 100KΩ | | RC20AE104K | BTS-100K | Vert. Mult. Plate |
| R85 | 47KΩ | | RC20AE473K | BTS-47K | Decoupling |
| R86 | 390KΩ 5% | | RC20AE394J | BTS-390K-5% | Vert. Mult. Plate |
| R87 | 5600Ω | | RC20AE562K | BTS-5600 | Vert. Peaking |
| R88 | 2.2 Meg. | | RC20AE225K | BTS-2.2 Meg. | Vert. Output Grid |
| R89 | 470Ω | | RC20AE471K | BTS-470 | Vert. Output Cathode |
| R90 | 470Ω | | RC20AE471K | BTS-470 | Vert. Output Decoupling |
| R91 | 220KΩ | 1 | RC30AE224K | BTA-220K | Feedback |
| R92 | 220KΩ | | RC30AE224K | BTA-220K | Feedback |
| R93 | 68KΩ | | RC20AE683K | BTS-68K | Horiz. AFC Filter Network |
| R94 | 100KΩ 5% | | RC20AE104J | BTS-100K-5% | Horiz. AFC Diode Load |
| R95 | 100KΩ 5% | | RC20AE104J | BTS-100K-5% | Horiz. AFC Diode Load |
| R96 | 4.7 Meg. | | RC20AE475K | BTS-4.7 Meg. | Horiz. AFC Diode Load |
| R97 | 470KΩ | | RC20AE474K | BTS-470K | Horiz. AFC Filter Network |
| R98 | 1800Ω 5% | | RC20AE182J | BTS-1800-5% | Horiz. Mult. Cathode |
| R99 | 220KΩ 5% | | RC20AE224J | BTS-220K-5% | Horiz. Mult. Grid |
| R100 | 5600Ω | | RC20AE562K | BTS-5600 | Horiz. Mult. Plate |
| R101 | 33KΩ | 1 | RC30AE333K | BTA-33K | Horiz. Mult. Decoupling |
| R102 | 27KΩ | | RC20AE273K | BTS-27K | Horiz. Peaking |
| R103 | 220KΩ | | RC20AE224K | BTS-220K | Horiz. Mult. Plate |
| R104 | 33KΩ | | RC20AE333K | BTS-33K | Horiz. Mult. Plate Decoupling |
| R105 | 100KΩ | | RC20AE104K | BTS-100K | Horiz. Output Grid |
| R106 | 100Ω | | RC20AE101K | | Parasitic Suppressor |
| R107 | 150Ω | 3 | V-6067-4 | | Horiz. Output Cathode |
| R108 | 100Ω | | RC20AE101K | | Parasitic Suppressor |
| R109 | 10KΩ | 5 | V-6984-5 | AB-10K | Horiz. Output Screen-Wire Wound |
| R110 | 8000Ω | 10 | | | Damper Filter-Wire Wound-See Note 6 |
| R111 | 560Ω | 5 | V-6984-6 | | Decoupling-Wire Wound |
| R112 | 68Ω | | RC20AE680K | BW-½-68 | HV Osc. Plate Decoupling |
| R113 | 33KΩ 5% | 2 | RC41AE333J | BT-2-33K-5% | HV Osc. Screen |
| R114 | 68KΩ | | RC20AE683K | BTS-68K | HV Osc. Grid |
| R115 | 100KΩ | | RC20AE104K | | HV Filter |
| R116 | 91Ω | 2 | V-9002-4900K | | Focus Control Shunt-Wire Wound |
| R117 | 270KΩ | | RC20AE274K | BTS-270K | Line Filter-See Note 2 |

† Items R81A, R81B, R81C, C65A, C65B and C65C are combined into one unit. See C65 under capacitor listings

Note 1. Some models use a 1000Ω resistor in this application.
Note 2. Not used in all models.
Note 3. Some models use a 47KΩ resistor in this application.
Note 4. Some models use 270KΩ resistor in this application.
Note 5. Some models use 22KΩ resistor in this application.
Note 6. Some models use 6000Ω, 10 watt resistor in this application.

## SPEAKER

| ITEM No. | RATINGS FIELD RES. | RATINGS V. C. IMP. | REPLACEMENT DATA WESTINGHOUSE PART No. | JENSEN PART No. | QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 53Ω | 4Ω | V-9593 | | 5E53S | |
| | CONE DIA. | V. C. DIA. | | | | |
| SP2 | 4 3/8" | 9/16" | | | | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | |
|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | WESTINGHOUSE PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. |
| T1 | 117VAC @ 2.3A | 600VCT .260ADC | 5VAC @ 6A | 12.6VCT @ 6A<br>SEC. 4<br>6.3VAC @ 1.2A | V-9595-1 | | P-3066 | |

## TRANSFORMER (SWEEP CIRCUITS)

| ITEM No. | RATING | | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | DC RESISTANCE | | WESTINGHOUSE PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| | PRI. | SEC. | | | | | |
| T2 | 390Ω | | V-9589-1 | | | | Hor. Output Choke |
| T3 | 650Ω | 8.7Ω | V-9584-1 | A-8113 | A-3036 | TSO-5 ① | Vert. Output Trans. |
| T4A | 37Ω | | V-9596-1 | | | | Hor. Deflection Coil |
| B | 57Ω | | | | | | Vert. Deflection Coil |
| T5 | 245Ω | | V-9590-1 | FC-10 | MF-1 | | Focus Coil |
| T6 | 2Ω | 700Ω<br>SEC. 2<br>0Ω | V-9278 | | | | HV Trans. |

① Drill one new mounting hole.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | IMPEDANCE | | DC RES. | | Westinghouse PART No. | STANCOR PART No. | MERIT PART No. | CHICAGO PART No. | |
| | PRI. | SEC. | PRI. | SEC. | | | | | |
| T7 | 2000Ω | 4Ω | 140Ω | .5Ω | V-9685 | A-3876 ① | A-2928 ① | RO-2 ① | ① Drill one new mounting hole. |

## COILS (RF-IF)

| ITEM No. | USE | DC RES. | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | | PRI. | SEC. | WESTINGHOUSE PART No. | MEISSNER PART No. | |
| L1 | Ant. Coil | 0Ω | | | | Part of tuner V-8210 |
| L2 | Ant. Coil | 0Ω | | | | Part of tuner V-8210 |
| L3 | RF Coil | 0Ω | | | | Part of tuner V-8210 |
| L4 | Osc. Coil | 0Ω | | | | Channel 6 part of tuner V-8210 |
| L5 | Osc. Coil | 0Ω | | | | Channel 13 part of tuner V-8210 |
| L6 | Fil. Choke | .5Ω | | | | Part of tuner V-8210 |
| L7 | 1st Video IF | .8Ω | | | | Part of tuner V-8210 |
| L8 | Fil. Choke | 1.8Ω | | V-9099-2 | | |
| L9 | 2nd Video IF | 1Ω | 1Ω | V-9586-1 | | |
| L10 | 3rd Video IF | 1Ω | 1Ω | V-9586-1 | | |
| L11 | Fil. Choke | 1Ω | | V-9099-1 | | |
| L12 | 4th Video IF | 1Ω | 1Ω | V-9586-1 | | |
| L13 | 21.6MC Trap | .2Ω | .1Ω | V-9592 | | |
| L14 | Fil. Choke | 1Ω | | V-9099-1 | | |
| L15 | 5th Video IF | 1Ω | 1Ω | V-9586-2 | | |
| L16 | Fil. Choke | 1Ω | | V-9099-1 | | |
| L17 | Peaking | 5Ω | | V-5902-4 | 19-1920 | 100 microhenries |
| L18 | 4.5MC Trap | 2Ω | | V-9591 | | |
| L19 | Peaking | 5.6Ω | | V-5902-1 | | |
| L20 | Peaking | 7.8Ω | | V-5902-5 | 19-1922 | 250 microhenries |
| L21 | Sound IF | 2Ω | | V-9594 | | |
| L22 | RF Choke | 5Ω | | V-5902-4 | 19-1920 | 100 microhenries |
| L23 | Ratio Det. Trans. | 6.5Ω | .8Ω | V-9574 | | |
| L24 | Ringing | 100Ω | | V-6764 | | |
| L25 | RF Choke | 17Ω | | V-9279-1 | | |

## MISCELLANEOUS

| ITEM No. | PART NAME | WESTINGHOUSE PART No. | NOTES |
|---|---|---|---|
| M1 | RF Tuner | V-8210 | |
| M2 | Ion Trap | V-6573-4 | |
| M3 | Switch | V-5406 | TV-Phono |
| | Trimmer | V-6454 | HV Osc.. |
| | Antenna Assembly | V-9521-1 | |
| | Safety Glass | V-9554 | |
| | Cabinet | V-1200-2 | Blonde |
| | Cabinet | V-1200-1 | Mahogany |
| | Cover | V-9550-1 | Cabinet Back |
| | Knob | V-6146-6 | Contrast, Horiz. Hold, Volume (Blonde) |
| | Knob | V-6146-1 | Contrast, Horiz. Hold, Volume (Mahogany) |
| | Knob | V-6284-9 | Channel Selector (Blonde) |
| | Knob | V-6284-7 | Channel Selector (Mahogany) |
| | Knob | V-9547-2 | TV Antenna (Blonde) |
| | Knob | V-9547-1 | TV Antenna (Mahogany) |
| | Knob | V-9471-1 | Picture Expander |
| | Knob | V-9104-1 | Vert. Hold, Brightness |
| | Knob | V-9104-4 | Fine Tuning |

# DISASSEMBLY INSTRUCTIONS

1. Remove eight push-on type control knobs.
2. Remove nine wood screws holding rear cover. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove antenna terminal strip.
5. Remove two wood screws holding wooden block 1" x 2" to rear of cabinet.
6. Remove two 3/8" hex head bolts, and one 1/4" x 20 bolt holding chassis in cabinet.
7. Remove chassis.

PICTURE TUBE REMOVAL

1. Follow disassembly instructions as given above.
2. Remove electronic magnifier mask.
3. Remove metal strip locking tube in place.
4. Remove socket from base of tube.
5. Remove ion trap.
6. Remove picture tube.

# HIGH VOLTAGE OSCILLATOR ADJUSTMENTS

Turn set off and disconnect the high voltage button from the picture tube. Make up a load resistor consisting of 18 one megohm, one watt, resistors in series. Connect the 18 megohms from the high voltage lead to the chassis. Connect a kilovoltmeter across the 18 megohm resistance.

Turn the set on and adjust the high voltage oscillator trimmer B2 for maximum reading on the meter. The kilovoltmeter must consist of a VTVM with suitable multiplier probe to measure 10KV.

If a kilovoltmeter is not available, a low range milliammeter connected between the low end of the 18 megohm resistor and chassis may be used. Adjust B2 for maximum current reading.

ZENITH
MODELS S14023, S14026

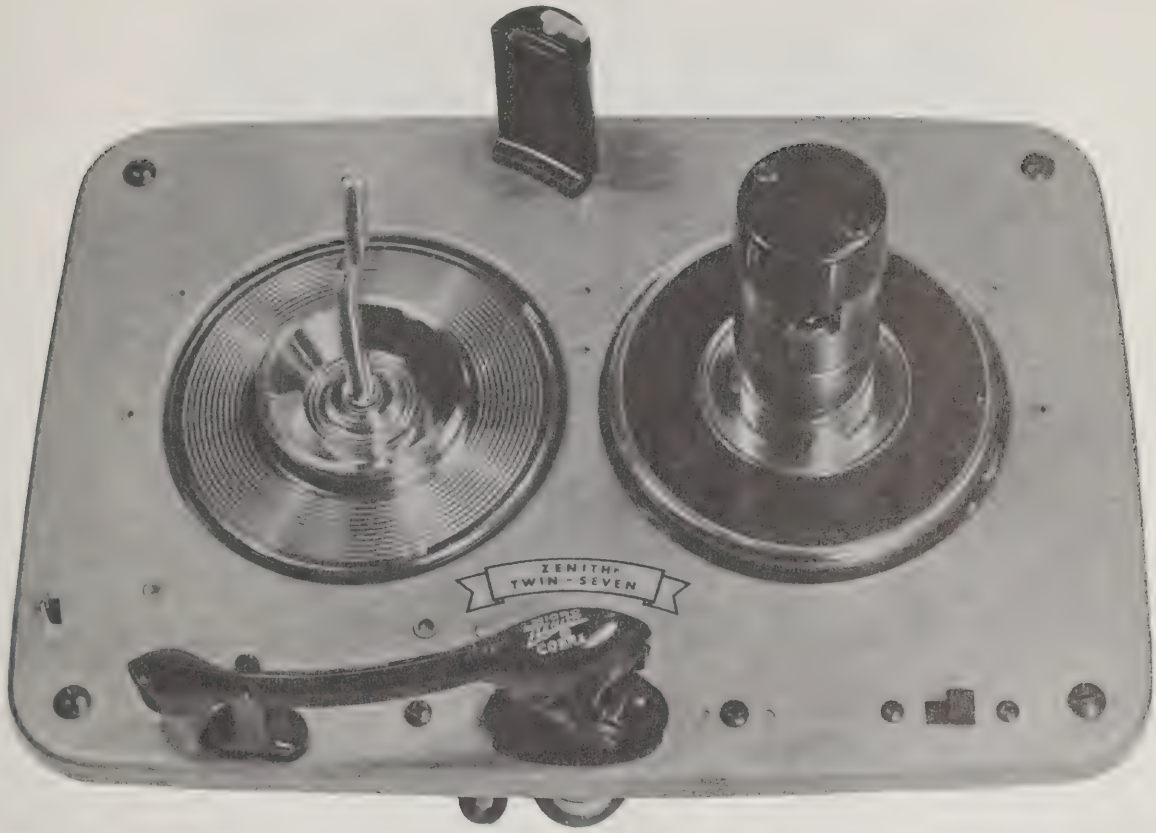



Figure 1

ZENITH
MODELS S14023, S14026

## GENERAL INFORMATION

The Zenith Models S14023 and S14026 Record Changers are designed to automatically play a stack of twelve 7", 33-1/3 RPM or twelve 45 RPM records; however, these records cannot be played simultaneously, nor can they be intermixed. These changers employ two turntables - - one rotating at 45 RPM and the other at 33-1/3 RPM. The single Cobra tone arm is used for either turntable. These changers will continue to play the last record until they are turned off manually.

These changers are alike both electrically and mechanically. The only difference between the two changers is in the AC power cable to the record changer and the connecting cable from the Cobra tone arm to the phono preamp.

Power supply is 117 Volts, 60 Cycles AC. Power consumption is 25 Watts.

Manufactured by:

Zenith Radio Corporation
6001 Dickens Avenue
Chicago 39, Illinois

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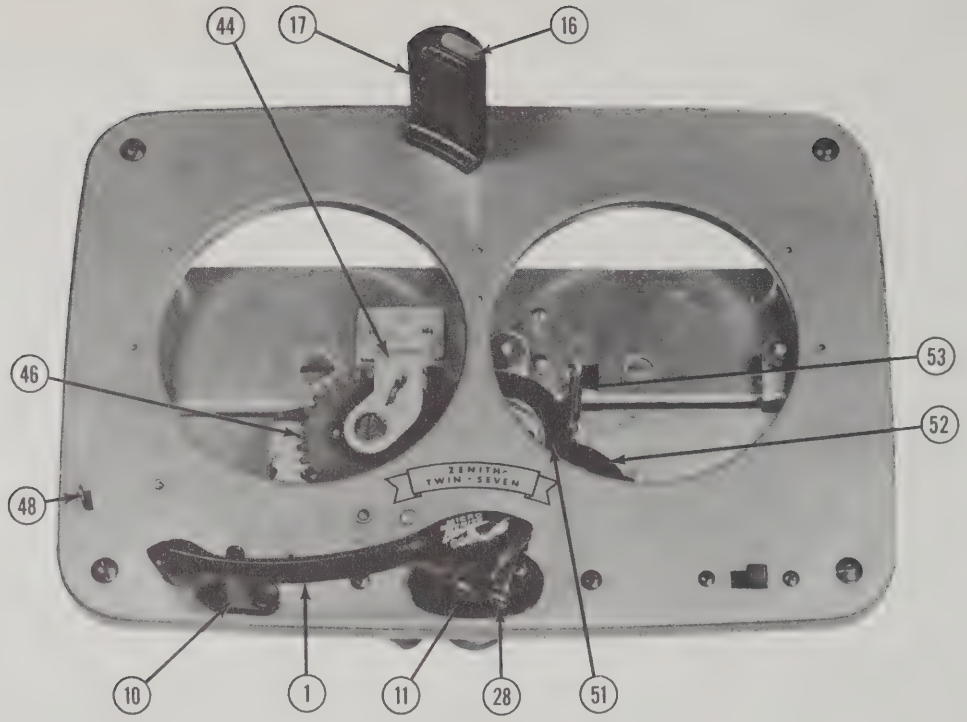



Figure 2

## OPERATION

Shipping Bolts -

Before placing the record changer in operation, the machine must be floated freely on the mounting springs. During shipping, the mechanism is secured by means of four shipping bolts. To float the changer, turn the mounting screws clockwise, until the heads are flush with mounting plate.

Leveling the Record Changer -

It is essential to have the changer level. Use a torpedo, or similar type level, on the record changer base plate; use adequate shims to level the record changer pan, or combination cabinet, to achieve perfect level.

NOTE: A single tone arm is used for playing 33-1/3 RPM and 45 RPM records. Both turntables rotate at the same time and at their relative speeds.

To Play 33-1/3 RPM Records -

Place up to twelve 7", 33-1/3 RPM records on the spindle (4), allowing them to rest on the spindle ledge and the record support (17). Raise the tone arm from its locked position on the arm rest (10), then let the tone arm rest on the arm rest (10). Turn the switch on and pull the reject lever (48) forward and release. The changer will now play the entire stack of records and will continue to play the last record until the changer is shut off.

CAUTION: Never shut the changer off, or handle the tone arm, during the change cycle. Always allow the changer to complete its cycle. Turn the switch off and place the tone arm on its rest. Remove the records from the turntable.

To Play 45 RPM Records -

Raise the tone arm from the rest (10) high enough to clear the 33-1/3 RPM spindle (4); then swing it to the right until it snaps into the 45 RPM playing position. Then lower it to a rest position. Place up to twelve 7" records on the spindle record supports (23); turn the switch on and pull the reject lever (48) forward, and release. The changer will now automatically play the entire stack of records and will continue to play the last record until the changer is turned off.

If the changer is to be used immediately, to play more 45 RPM records, raise the tone arm from the top record and move it clear of the records, letting it come to a rest position. Remove the records from the turntable, then proceed in the same manner as above. However, if the changer is not to be used for a period of time, it is suggested to raise the tone arm clear of the spindle (4), swing the arm to the left until it snaps into the 33-1/3 RPM position, and then place the tone arm in a locked position on the arm rest.

## CHANGE CYCLE

The two turntables are rim-driven simultaneously by the slow idler wheel (51), which is driven by the motor shaft through the media of the fast idler wheel (52). The clutch gear (46) and clutch plate (upper) (47), being driven by the turntable (6), drives the change cycle mechanism. The clutch pawl (50A), which pivots from its mounting on the lower clutch plate (50), is normally held from engaging the upper clutch plate (47) by the trip lever (68). The clutch pawl (50A) is released to engage the upper clutch plate, to start the change cycle, by either pulling on the reject lever (48) or by the tone arm as it moves into the trip groove of the record. As the tone arm

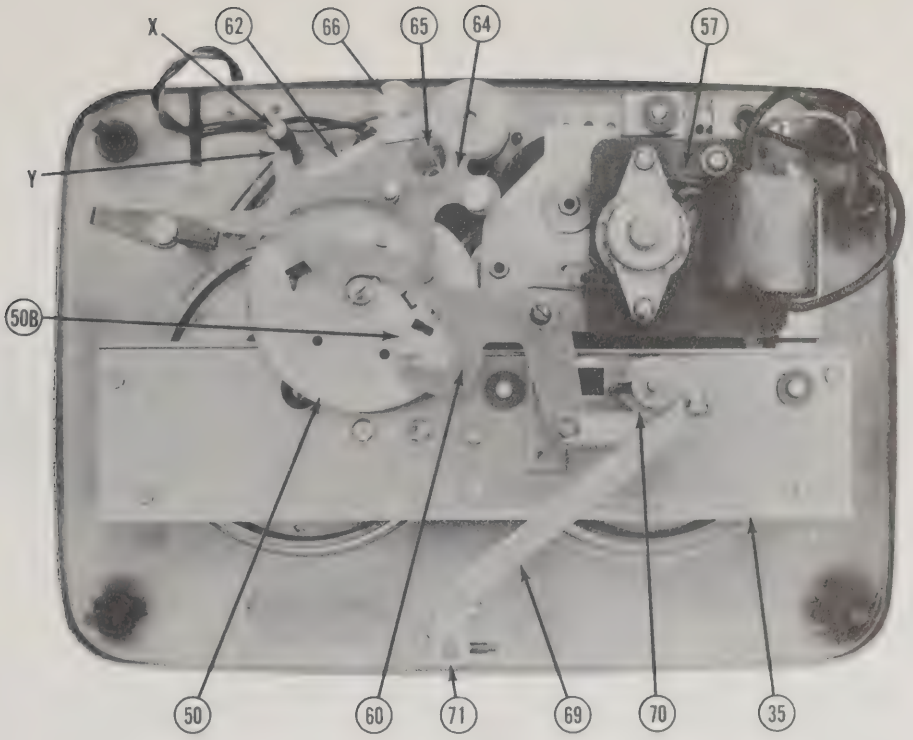



Figure 3

moves across the record, the friction between the felt washer (63) and the trip actuator stud assembly (62), created by the trip weight (61), carries the trip actuator and stud assembly (62) in toward the trip lever (68). As the tone arm nears the end of the record, the nylon stud on the trip lever assembly (62) is contacted by the upper clutch plate (47), pushing the trip actuator back away from the trip point. However, as the tone arm moves into the fast lead-in groove of the record, the nylon stud on the trip lever assembly (62) engages and moves the trip lever (68), thereby allowing the trip pawl (50A) to engage the upper cam plate (47) setting the lower cam plate in rotation and starting the change cycle.

As the lower clutch plate (50) rotates, the lift lever (67) is actuated by the elliptical edge of the plate (50), raising the tone arm from the record. The nylon bushing (50B), Figure 3, of the lower clutch plate (50) moves against the throw-out cam and lever assembly (64), swinging the tone arm out over the tone arm rest (10). At the same time, the boss (50C) (exploded view) resets the trip lever (68). The nylon bushing (50B) now engages the ejector cam (60); this, in turn, actuates the 45 RPM spindle dropping mechanism and the ejector shaft and plate assembly (16) through the media of parts (69), (70), and (71), Figure 3, thus dropping a record to the turntable. Upon further rotation of the lower clutch plate (50), the tone arm is moved in and lowered to the starting groove of the record. The 45 RPM spindle ejecting assembly and the ejector shaft and plate assembly (16) are returned to the normal out-of-cycle position. The trip pawl (50A) moves against the trip lever at point (68A) and is disengaged from the upper clutch plate (47). This completes the change cycle.

## ADJUSTMENTS

Tone Arm Height -

The height of the tone arm is adjusted by the lift pin adjusting screw (13). The tone arm must be raised to make the adjustment. Set the adjustment screw (13) so that the needle clears a stack of twelve records on the turntable and not high enough to hit the records resting on the record shelf.

Set-Down Adjustment -

The set-down point is adjusted as follows: If a minor adjustment is necessary, it may be done by the adjusting stud (66). The stud closest to the motor is for 45 RPM records, while the other stud is for 33-1/3 RPM records; however, if the tone arm has been removed, the adjustment is as follows. Turn the 33-1/3 RPM adjustment stud to a neutral position; i. e., the stud should be in a position whereby, if it is turned one way or the other, the throw-out lever (64) will be moved in the same manner.

Place the tone arm in a locked position in the arm rest (10), and with the slab head screws loose, move the throw-out lever (64) so that there is a gap of approximately 1/4" between the aligning stud "X" and the throw-out lever (64), Finger "Y", Figure 3. Tighten the slab head set screws. Place a 33-1/3 RPM record on the spindle (4) and check the set-down point. A minor adjustment may now be made by the adjustment stud (66). Place a 45 RPM record on the 45 RPM spingle, raise the tone arm clear of the 33-1/3 RPM spindle, and swing the arm to the right until it snaps into position. Check the set-down point by running the changer through its change cycle, then adjust it by the 45 RPM adjustment stud (66).

Manual Trip Adjustment -

The manual trip (48) should be adjusted so that the brass spring on the trip (48) clears the trip lever (68), at point (68B), by 1/8". This may be accomplished by bending the spring. There should also be

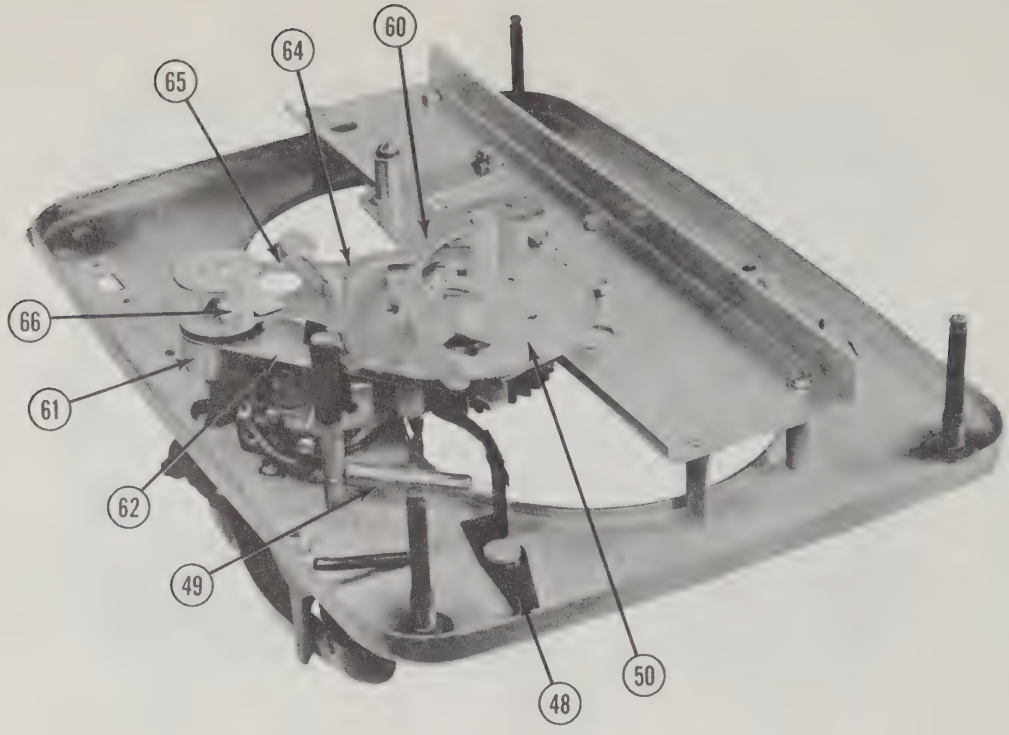



Figure 4

a clearance of .020 to .040 between lip (68C) and the top surface of the lower clutch plate (50). (See exploded view.)

## TROUBLES

Needle Does not Track Across Record Properly -

1. Accumulation of lint and dirt around needle and cartridge:

   (a) Clean all lint and dirt from cartridge. For best reproduction, records should be kept free from lint and foreign material.

2. Needle tip bent or broken:

   (a) Check the needle to see if it is bent or broken. Replace needle.

3. Tone arm binding:

   (a) Check the pickup leads to see if there is enough slack to allow the tone arm to move freely across the record.

   (b) Check the hinge bearings to see if they are binding at any point. The lateral movement of the tone arm must be free to move without any binding.

4. Excessive vibration:

   (a) Excessive vibration due to unsteady mounting: Floor vibrations and passing of heavy vehicles will cause the arm to glide across the record.

Mechanism Starts Slowly and Motor Gets Hot -

1. Line voltage too low:

   (a) Check the line voltage; it should not be less than 105 volts.

2. Check Lubrication:

   (a) Check the unit for lubrication. The lack of lubrication, old or over-lubrication may cause the parts to stick, resulting in slow operation of the changer.

3. Room temperature abnormally low.

Needle Slides Over the Record Grooves -

1. Cabinet tilted:

   (a) The cabinet and the record changer should be absolutely level. Also, the shipping bolts should be loosened to float the changer. (See paragraphs on "Shipping Bolts" and "Leveling the Record Changer.")

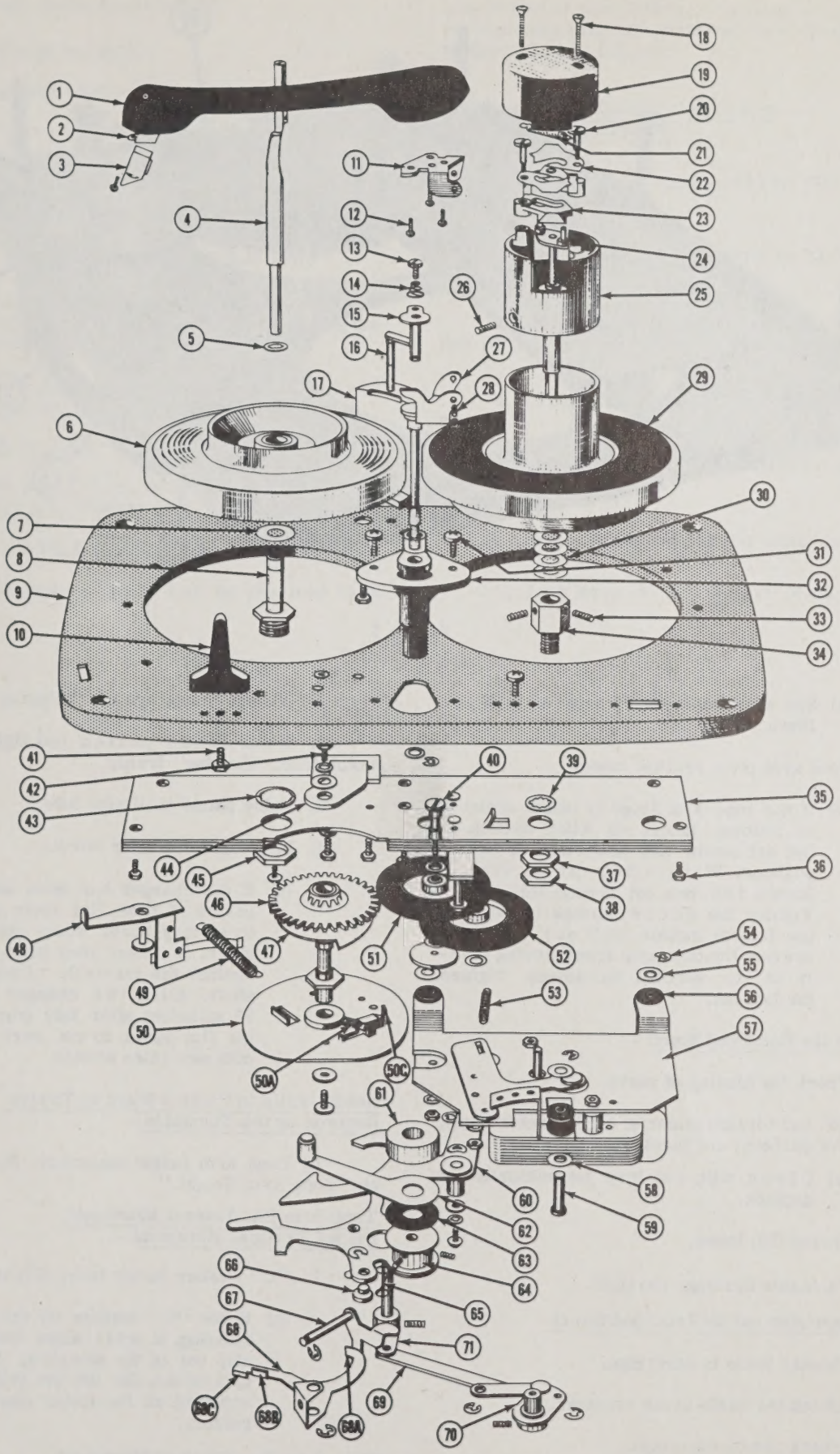
2. Badly worn or broken needle:

   (a) Check the cartridge mounting bracket (2) to see if it is secured to the tone arm; tighten.

   (b) Check the needle to see if it is bent or broken; replace.

Tone Arm Falls Off Record -

1. Check the tone arm for set-down:




A PHOTOFACT "EXPLODED" VIEW

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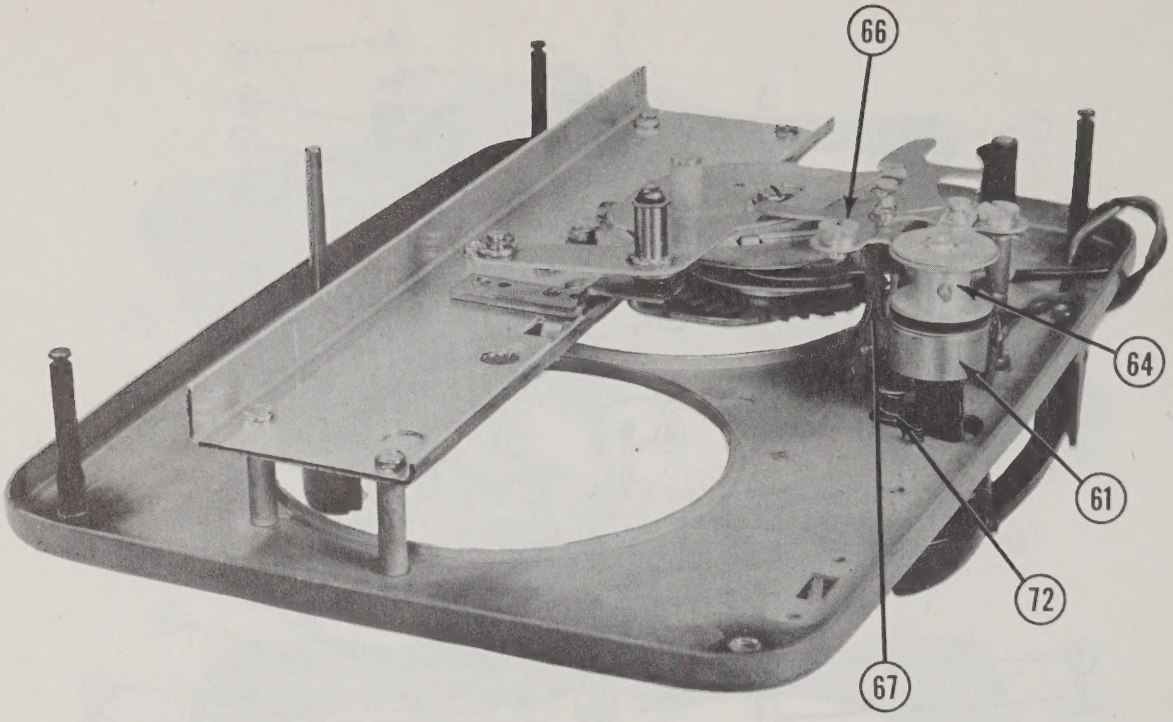


Figure 5

(a) See adjustment on "Tone Arm Set-Down."

2. Tone arm pivot bracket loose:

(a) If the tone arm hinge is loose, adjust it as follows: Insert an Allen wrench in the set screw (28) and hold it in this position. With a hex-head wrench, loosen the hex nut around this screw. Tighten the screw enough to take out the lateral motion, but not enough to prevent the tone arm from moving freely in its vertical movement. Tighten the hex nut.

"Wows" in the Recorded Sound -

1. Check for binding of parts.

2. Oil and foreign material on the motor shaft, rubber drive surfaces and turntable rims:

(a) Clean with carbon tetrachloride or naphtha.

3. Spring (53) loose.

4. Turntable bearings too tight.

Changer Operates but no Recorded Sound -

1. Broken leads to cartridge.

2. Check the audio in the receiver.

3. Check needle cartridge.

Rumble and microphonics During Reproduction -

1. Changer not "Floated" properly:

(a) See paragraph on "Shipping Bolts."

2. Motor leads pulled too tight preventing motor from "floating" freely.

3. Noisy phono oscillator tube.

4. Impression on idler wheel:

(a) If the changer has been idle for a long period of time, flat spots on the rubber tires may occur where they touch each other, or where they have been resting against the turntable rims and motor shaft. Allow the changer to run 10 or 15 minutes; after this (run in) time, if the flat spots do not work out, replace with new idler wheels.

Needle Fails to Clear a Stack of Twelve Records on the Turntable -

1. Tone arm height incorrect. See adjustment on "Tone Arm Height."

Tone Arm Has Lateral Movement but not Vertical Movement -

1. "C" washer on lift lever (67) missing.

(a) If the "C" washer on the lift lever is missing, it will allow the lift lever to slip out of its mounting. If this condition exists, the lift pin (15) will not be actuated as the lower clutch plate (50) rotates.

Tone Arm Has Vertical Movement but Has no Lateral Movement -

1. Slab-head set screws in throw-out cam (64)

loose. See "Set-Down Adjustment."

Changer Continues to Cycle -

1. Trip pawl (50A) sticks:

   (a) Clean with carbon tetrachloride and loosen pawl in its pivot.

2. Brass spring on manual trip (48) bent too close to the trip lever (68):

   (a) See adjustment on "Manual Trip."

3. Hooked end (68A) of trip lever (68) bent too close to the upper clutch plate (47), thus allowing the trip pawl to bounce and engage the upper cam:

   (a) Straighten the trip lever (68) so it will be perpendicular to its mounting stud.

Changer Fails to Cycle -

1. Trip pawl (50A) binding and, as a result, not raising to engage the top cam.

## LUBRICATION

Additional lubrication should not be required for a long period of time; however, in cases of unusual use, or high-operating temperature, the changer should be lubricated as follows:

Lubricate the Following Places with No. 10 Light Machine Oil -

1. 33-1/3 RPM ejector shaft (71), Figure 3, near the base plate.

2. Rivet and shoulder stud on 33-1/3 ejector shaft (69).

3. Rivet and shoulder stud on 45 RPM ejector link (70).

4. 45 RPM ejector shaft spindle mounting plate (24).

5. Trip lever (68) in two places on its pivot shaft.

6. Reject lever (48) at the reject lever pivot.

7. Link lever (67) on the shaft pivot.

| Ref. No. | Part No. | Description |
|---|---|---|
| 1 | S-16073 | Tone Arm Assembly (Complete less cartridge) |
| 2 | 12-1658 | Cartridge Retaining Bracket |
| 3 | S-15222 | Cobra Tone Arm Cartridge |
| 4 | S-16061 | Spindle and Dog Assembly (33-1/3 RPM) |
| 5 | 93-1011 | Turntable Retaining Washer |
| 6 | S-16065 | Turntable and Bearing Assembly (33-1/3 RPM) |
| 7 | | Flat Steel Washer |
| 8 | 94-684 | 33-1/3 RPM Spindle Sleeve |
| 9 | | Baseplate |
| 10 | 84-73 | Tone Arm Rest |
| | 114-253 | 6-20 x 3/8 Hex-Hd. S. T. Screw (Mounting screw tone arm rest) |
| 11) 27) | S-16074 | Swivel Bracket and Shaft Assembly |
| 12 | | Mounting Screw - Swivel Bracket |
| 13 | 112-778 | Adjusting Screw (Lift Pin) |
| 14 | 80-750 | Adjusting Spring (Lift Pin) |
| 15 | S-16075 | Lift Pin and Plate Assembly |
| 16 | S-16072 | Ejector Shaft and Plate Assembly |
| 17 | 84-72 | Record Support |
| | 114-253 | 6-20 x 3/8 Hex. Hd. S. T. Screw (Record support mounting screw) |
| 18 | 112-777 | #4-40 x 3/4 Oval Phillips H. M. S. |
| 19 | 15-93 | Spindle Cap (Red) |
| 20 | 112-776 | Shoulder Screw |
| 21 | 80-749 | Record Support Spring |
| 22 | 83-1666 | Record Separator |
| 23 | 57-1555 | Record Support |
| 24 | S-16066 | Ejector Shaft and Plate Assembly |
| 25 | S-16067 | Upper Spindle Assembly (45 RPM) |
| | 76-557 | Upper Spindle |
| 26 | 73-70 | 8-32 x 1/2" Allen Hd. Set Screw Cuppoint |
| 27 | S-16074 | Swivel Bracket and Shaft Assembly (Part of 11) |
| 28 | 73-121 | Special Set Screw |
| 29 | S-16104 | Turntable and Ring Assembly (45 RPM) |
| 30 | 93-1013 | Thrust Washer |
| 31 | 112-779 | 6-32 x 3/8 Phillips B. H. M. S. for Item 32 |
| 32 | 199-123 | Tone Arm Sleeve |
| 33 | 73-112 | 8-32 x 1/2 Slab Hd. Set Screw Cuppoint |
| 34 | 94-682 | 45 RPM Spindle Bushing |
| 35 | S-16060 | Spindle Mounting Plate Assembly |
| 36 | | Spindle Mounting Plate Screw |
| 37) 38) | 54-62 | Hex Nut for 45 RPM Spindle Bushing |
| 39 | 93-143 | Shakeproof Lock Washer for 45 RPM Spindle Bushing |
| 40 | 76-561 | Idler Wheel Shaft |
| 41 | 114-253 | 6-20 x 3/8 Hex Hd. S. T. Screw |
| 42 | 113-21 | Hex Head Screw for Mounting Lower Clutch Assembly |
| 43 | 93-1012 | Shakeproof Lock Washer for 33-1/3 Spindle Sleeve |
| 44 | | Clutch Assembly Mounting Bracket |
| 45 | 54-300 | Hex Nut for 33-1/3 RPM Spindle Sleeve |
| 46 | 34-196 | Clutch Gear |
| 47 | S-16063 | Clutch Plate Assembly (Upper) |
| 48 | S-16057 | Reject Lever and Spring Assembly |
| 49 | 80-754 | Reject Lever Return Spring |
| 50 | S-16064 | Clutch Plate Assembly (Lower) |
| 50A | 60-21 | Pawl |
| 51 | 61-142 | Idler Wheel - Slow |
| 52 | 61-143 | Idler Wheel - Fast |
| 53 | 80-753 | Idler Wheel Tension Spring |
| 54 | 188-129 | Retaining Ring |
| 55 | 93-1018 | Motor Mounting Washer (Bakelite) |
| 56 | 125-77 | Motor Mounting Grommet |
| 57 | S-16058 | Motor Mounting Plate and Lever Assembly |
| | 141-128 | Motor 115 V., 60 Cycles |
| 58 | 93-1018 | Motor Mounting Washer (Bakelite) |
| 59 | 56-277 | Grommet Retaining Pin |
| 60 | S-16069 | Ejector Cam and Bushing Assembly |
| 61 | 135-15 | Trip Weight |
| 62 | S-16079 | Trip Actuator and Stud Assembly |
| 63 | 93-1017 | Felt Washer |
| 64 | S-16076 | Throw-out Cam and Lever Assembly |
| 65 | 80-752 | Tone Arm Positioning Spring |
| 66 | 97-357 | Adjusting Stud |
| 67 | S-16080 | Lift Lever and Pin Assembly |
| 68 | 117-180 | Trip Lever |
| 69 | S-16071 | Ejector Lever Link and Bushing Assembly |
| 70 | S-16070 | Ejector Lever and Bushing Assembly |
| 71 | 199-122 | Ejector Shaft Sleeve |
| 72 | | Lift Pin Spring |